The Evidence for Standardisation within the Archaeological and Historical Records of the Baltic Viking Age: Implications for our Understanding of Trade and Exchange

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Abstract

The archaeological and historical evidence for standardisation and measurement within the trading networks of the early medieval period of the Baltic Sea are examined and discussed within the regional context of the growth of markets and towns during the Viking Age. The chronological framework for the discussions spans the period between the 8th and 12th centuries, although the archaeological aspects tend to focus upon the earlier period. Historical sources are consulted, including the rich descriptions of the Rus and the lands of the Western Slav that survive from Arabic geographers and travellers. The developing socio-economic situation within the Western Slavonic regions of the southern Baltic coast is highlighted, setting important early towns such as Wolin and the wealth of the silver hoards of the Pomeranian region into the wider context. Concentrating upon the archaeological and historical evidence for widespread systems of standardisation and measurement (including the evidence of Arabic-inspired weights and weight systems), the author hopes to demonstrate the active participation of the Western Slavs in the developing trading networks. A hypothesis – that there is visible volumetric standardisation within the widely distributed Western Slavonic pottery found throughout the Baltic region – is successfully tested, indicating that some types of pottery (Feldberg, Menkendorf, Vipperow, Teterow and Bobzin wares) seem to display definite elements of quantity standardisation. As a consequence, it is suggested that foodstuffs such as honey or salt, originating in the inland forests and coastal salt pans respectively, may have been widely traded.

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Author's declaration:

This theses is being submitted in particular fulfilment of the requirement for the degree of PhD. The work has not previously been accepted in substance for any other degree and is the result of my own independent investigation, except where otherwise stated. Other sources are acknowledged by explicit references.

Introduction

Introduction to the research

Is there archaeological evidence of a standardisation of the units of volume, length and weight in northern Europe during the early medieval period? This thesis will argue that there is such evidence – and will explore the reasons behind such a standardisation. Is it possible that there was agreement or even organisation amongst the merchants and between the market places of the early medieval period, operating within the Baltic and beyond? Our knowledge of the expansion of trade – and the associated market places – at this time is extensive, with much being discovered by the excavations undertaken at such places as Birka, Wolin or Novgorod and by the study of the written and iconographic sources, such as Adam of Bremen or Ibrahim ibn Jacob. Using the rich sources available in the records, artefacts and reports, this thesis will explore all possibilities for the standardisation of the units of volume, length and weight. It will concentrate on the study of pottery, weights and ingots, but will also consider different artefacts such as wooden barrels. The commodities of trade, such as drinking honey (mead), wax, furs, fabrics and salt, will also be discussed.

The wider context within which early medieval trade and exchange developed will be explored. The early medieval societies involved will be discussed, concentrating particularly on the development of social structure and the internal and external dynamics involved. I am particularly interested in the social implications surrounding the growth of towns in the southern Baltic region occupied by the Western Slavs. The early medieval tribes of the Western Slavs (the Obodrites, Veleti and the many Pomeranian tribes) developed strong intertribal links and witnessed the successful growth of towns and trading communities – prior to the traditional feudal indicators of kings and vassals, coinage and Christianity. The best known of these intertribal groupings is known as the Veleti (or Lutize) Union (and known as the Wielecki Union in Poland). At the end of the 10th century, the Veleti Union was a regional union of

tribes of the Polabian Slavs. The archaeological evidence of rural settlement, strongholds and associated material culture does not distinguish the Union from its neighbours. However, the success of the Veleti Union (until its destruction during internal conflict in AD 1058-60) illustrates the potential of this study. Current theories concerning the role of feudalism in the growth of towns and trade will perhaps prove inadequate when used in the study of the accelerating social and economic structures of the Western Slavs. I will argue that the growth of towns and trade in this region had both internal and external stimuli and resulted both from and in the development of forms of early feudal social structures – political authority that was not necessarily a traditional feudal Christian kingdom.

Norman Davies, in his recent overview of European history *Europe*, states that feudalism "remained essentially a Western phenomenon... As far as the [medieval] countries of central Europe are concerned, historians strongly disagree over the importance of feudal institutions. Marxists assume that feudalism had to be the basis of social order; others, on the whole, argue that it did not. Everything depends on what definition of feudalism is used" (1997, 315). Even the form of feudalism known to the true medieval nation states of central Europe remains a contentious issue. Arguments regarding the exact definitions of early feudal development within the societies of the Western Slavs in the early medieval period remains largely outwith the scope of this thesis; however, a description of the developing social structures of the region most certainly does and will form part of the conclusions of the thesis.

To further explain this terminology, I feel that the growth of towns, trade and more sophisticated social structures were both interlinked and independent in different regions. For example, the early medieval towns of the Baltic as a whole can be seen to develop from royal or authoritative centres of power (such as Sigtuna or Oldenburg), from market places (such as Wolin), from religious centres (such as Arkona) and areas with distinct local resources (such as the salt pans of Kołobrzeg). Several may well have developed from a deliberate foundation, whether by merchant or elite. In some areas the towns and trade

will have stimulated local power bases, later to develop into feudal states, while in others the early power base will have stimulated the foundation of the town. The development of towns and more complex social structures were certainly not contemporary or to a fixed pattern. The only continuous thread running through the growth of towns in the Baltic is the trading network itself.

Saunders states of feudalism that "the development [of feudalism] constitutes the fundamental change during the early medieval period in northern Europe. This was characterised by the disintegration of kinship-dominated chiefdom or tributary society and the rise of land-based social relations, culminating in the establishments of feudal-based states. The dynamics if this process were the economic, political and ideological struggles over power and control in society" (1995, 32). This description of feudalism is not useful when describing the growth of social complexity amongst the Slavonic tribes – for whom many interesting (almost democratic) traits have been described in the historical sources prior to the formal establishment of kingdoms. The nature of the tribes of the Western Slavs (the Obodrites, Veleti and the many Pomeranian tribes) was such that they can only be described as stable chiefdoms; the early kingdom of Mieszko I of Poland could be described as a much larger chiefdom. He accumulated his power and territory with the aid of a standing army and taxes – but, prior to his conversion to Christianity, there is little evidence of the trappings of a feudal state. The early medieval tribes, unions and kingdoms of the Western Slavs can be described as early feudal societies – stable territories, flourishing towns and trade, regular contacts and formal agreements with their neighbours, although without the formal vassal system required of a true feudal society.

Indeed, turning towards the larger regional context, the use of standards such as weights within the market places of the Baltic is one of the best known examples of a feudal trait (rigorous control of trade) prior to the establishment of feudal kingdoms. In addition, the growth of royal mints certainly developed after the establishment of the Baltic trade network. While the Scandinavian towns were usually associated with a royal or high-status site (Clarke and

Ambrosiani 1995, 137), those in the Western Slavonic region were not. Wolin developed on the site of a long-established crossroads and was never connected with a distinct regional political centre.

As has been mentioned previously, the main thread running through the study of the growth of towns and trade in the Baltic region during the early medieval period or Viking Age is the trading network itself. The commodities of trade will be discussed later. The merchants involved in this trade have been described as "a class set apart from the normal native population: they were richer, more eclectic in their absorption of foreign traditions and accumulation of personal possessions. They probably were members of a semi-independent and supra-national group responsible only to the king or administrator of the town in which they were living or trading at any given time" (Clarke and Ambrosiani 1995, 175). The merchants who operated from Staraja Ladoga, enabling the distribution of the silver dirhams that arrived there from the Islamic world around the Baltic coast, seem to have been both Scandinavian and Slavonic (Noonan 1986, 345). It is the archaeological and historical evidence of this merchant class that concerns this thesis – focusing primarily on evidence of standardisation within the methods and commodities of trade. Information regarding such standardisation could release insights concerning the practices and inter-relationships of this merchant class.

Between the 9th and 11th centuries an area including Scandinavia and central and Eastern Europe can be described as one zone of exchange, with the Baltic Sea as the axis of trade. One expression of this uniformity is the distribution of the silver Arabic dirham – and of hack silver – within the archaeological record. From the middle of the 10th century we can also include local, Carolingian and Saxon coins as indicators of trade. A common system of weights also operated in this zone of exchange, while Western Slavonic pottery types (such as Menkendorf ware) have been found in many settlements around the Baltic and northwest Europe. Over time, the increasing complexity of social organisation within the zone of exchange can be seen to mirror the increasing complexity of trade systems.

It is very possible that there were standardised volumes for some Slavonic pottery types, which would have serious implications concerning our understanding of trade and exchange in the region. Many of these vessels were containers in which foodstuffs were cooked, consumed, transported or produced. The natural standardisation of a pottery size or shape, depending upon the task for which it was intended, may have become *de facto* measurements for these products.

The main body of this thesis concerns the study of Slavonic pottery that has been recovered from excavations around the Baltic and the North Sea. The great majority is typologically Slavonic but does not necessarily originate from Slavonic regions. Only those vessels where it is possible to measure and quantify their volume will be examined (whole pots and those where at least the complete section and base has been recovered). The aim is to test the hypothesis that a form of standardised unit existed in the pottery of the Viking period. Physically, whole modern vessels of different sizes and shapes were measured using different methods and the results compared. Both water and sand were used to measure the volume (using both loosely packed and tightly packed sand); calculations made using mathematical formulae (using the 'summed-cylinder' method); the digitising method (using the improved 'summed-cylinder' method) employed. An initial experiment indicated the accuracy and ease of the digital method, which was then used to calculate the volume of all available drawn vessels in the archaeological record.

Most studies concerning the standardisation of pottery manufacture implicitly assume that any such regularity is due to production efficiency and is nothing but a by-product of the routine of large-scale craftwork. Further examination suggests that such standardisation is linked to more complex levels of socio-political organisation – and is rooted in a concern for specific volumetric measures.

This thesis will suggest that there may well have been such a standardised volume system operating within the widely distributed Slavonic pottery. Many of these vessels were containers in which foodstuffs were cooked, consumed, transported or produced. The standardisation of a pottery size or shape may result gradually over time from the demands or requirements of the task for which it was intended; or may have been due merely to the whim or ease of the potters and 'production efficiency'. Regular sizes may also have resulted from a requirement for product measurements (perhaps commercial, or as a method of taxation or systematic control) – or had simply become de facto measurements for these products over time. The causes of pottery standardisation may remain unknown, but I will argue that such archaeological uniformity within a traded resource – perhaps most perfectly encapsulated by the widespread use of the Arabic market weight system – could point to some degree of co-operation between the merchants and early trading emporiums of the Baltic.

Contextual background: a short historiography of Slavonic studies

When considering the importance of the Slavs in the early medieval period and their location on the historical map of Europe, an immediate impression is reached: that the first mentions of the Slavs in the historical sources are very late when compared to the great majority of other early medieval peoples or ethnic groups. The earliest information about Slavs appears in historical sources of the first half of 6th century AD (Godłowski 1999, 52). The historical and archaeological study of the Slavs and their origins has been dominated by political factors (Curta 2002, 202) and, in attempting to set the Slavs into the regional context of the Baltic Viking Age or early medieval period, it is useful to briefly describe the political background to the historiography of the subject.

The historical and archaeological study of the Western Slavs has long been subjected to political nationalistic interpretation, an insular battle that has unfortunately removed the issue of the development of the southern Baltic towns and the Western Slavonic region from the overall general European academic discussion of this period. The growth of the subject during the 18th and 19th centuries will be discussed, alongside the theoretical arguments

surrounding the origins and identity of the Slavs. Twentieth century developments will be explored, highlighting the influences made by nationalistic and Communist political direction.

The 18th and 19th centuries

The political situation in most Slavonic countries during the 18th and 19th centuries, at the time of the birth of history as a scientific and academic subject, was the jurisdiction of a foreign government. This situation resulted in many groups of intelligentsia and political elites calling attention to the history of their origins, land and nation, as both inspiration for nationalistic ideals and to keep alive the spirit of national identity and an aspiration for freedom. Josef Dobrovský (1753 – 1829), considered to be the founder of Czech Slavonic studies, with his *History of Czech Language and Literature* and *Introduction to the Old Slavic Language* (both written in German), influenced and encouraged further scholars in the field (Gojda 1991, 2). These patriotic factors very strongly dominated the development of historical thought in 19th century Poland, the nation most closely related to the archaeology of the Baltic rim.

After the final partition of Poland in 1795, Poland no longer existed on the map and her people were under the jurisdiction of three different foreign governments. In the middle of the 19th century, after several failed uprisings (such as that against the Prussians in 1848 and the January Uprising of 1863-4 against the Russians) there was a general crackdown on expressions of Polish national identity. The previously revived Polish cultural and scientific institutions and learned societies were closed and the educational system was restricted. Several intensive programs towards the Germanisation and Russification of the Polish people were launched. Indeed, relatively favourable conditions for the development of Polish culture and science existed only in the Austrian section (such as the Universities of Krakow and Lvov), where the policy toward Poland was quite liberal (Rączkowski 1996, 195).

The failures and fiascos that were the successive uprisings in Poland (in 1830/31, 1846, 1848 and 1863/64) proved that popular support for national movements was actually very weak. Several leading intellectuals realised that such actions were worthless without widespread support from society. '*Praca organiczna*' (organic work) described the new direction towards grass-roots education, designed to diminish the discrepancy between the aspirations of independence, the aims of the intellectuals and the nobility and the possibility of the realisation of these aims through popular and widespread support. It involved long-term educational and organisational activity throughout the whole of society, which it was hoped would create the basis for propagating the sense of national distinctiveness.

The influence of the intellectuals on the process continued to be very important. They defined both the goals of the national ideology and directed the avenues explored towards their realisation. They realised the necessity to create the basis for a conscious popular identity rooted in a common glorious past, language and cultural tradition with a common hostility towards the invader (Gierowski 1988, 223-26). The views and ideas of the intelligentsia were transmitted to the public mainly by means of underground education and publication, as school syllabuses in the Prussian and the Russian sectors did not offer any possibility of creating and developing national identity. Many self-education groups were established which developed to meet the needs of young Poles. These secret history courses in underground schools and groups highlighted Polish history, tradition and culture, while archaeology and artefacts were used both to educate and to display the rich heritage of the Slavs (Buszko 1988).

The second half of the 19th century also brought different political views on the shape of a future revived Poland. In the Russian sector, the traditional view of the necessity of restoring the borders to what they had been before 1772 was widespread. This implied that Lithuania, Byelorussia and the Ukraine would be treated as integral parts of Poland, an idea complimented by the fact that Polish cultural traditions were present in these countries, as well as many ethnic Poles

(especially in Lithuania). Polish politicians treated the gradual rise of the independent national awareness of Lithuanians, Byelorussians and Ukrainians at this time in a manner similar to the anti-Polish activity of the Russian authorities. Similarly, archaeologists were not very interested in the regional ethnic interpretation of archaeological evidence. Thus, if such evidence appeared, it was defined only as 'Slavonic', without pointing out the differences between the eastern and western Slavs. Neither were the differences between the Slavs and the Balts generally taken into consideration (Rączkowki 1996, 198).

In the Prussian sector most of the politicians did not attach any importance to the eastern borders. Instead, they focused their attention on the line of the western border. They considered it necessary to define the western border of Poland based on the ethnic distribution; this implied that not only the region of Wielkopolska would be included in the territory of the revived Poland, but also Silesia and East and West Prussia. There was a clear political demand for scholarly definition of the historical ethnic borders between the Slavs and the German people.

Archaeology was beginning to evolve into a science at this time, developing the methodological and theoretical basics. In Poland, new journals such as *Wiadomości Archeologiczne* ('Archaeological News', which began in Warsaw in 1920) and *Przegląd Archeologiczny (*'Archaeological Review', founded in Poznań in 1919) and institutions (such as the Museum of Poznań) were partly involved in the process of creating national identity and defining Polish separateness from the adjoining nations (Sklenář 1983, 156; Rączkowski 1996, 198). Similar journals of Czech archaeology were also founded, some being significantly earlier in date. The journal *Pramátky archeologické* ('Archaeological Monuments') has been the leading archaeological publication in Bohemia since 1854 (Gojda 1991, 4).

Autochthonism

One question in particular is the undisputed unexplained mystery of Slavonic Studies: from where and exactly when did the Slavs arrive in Europe in the Danube river basin? There are many theories regarding the origin of the Slavs and their identification within the ancient and historical sources – some theories began in the medieval period, although modern academic study about the origins of the Slavs and of Slavonic culture began in the second half of the 19th century, lead by Russian and Czech scholars. Perhaps the greatest contribution to the establishment and expansion of Slavonic archaeological studies was made by Lubor Niederle (1865 – 1944): his multi-volume work *Slovanské starožitnosti* ('The Antiquities of the Slavs') was published between 1902 and 1924 (Gojda 1991, 4; Curta 2002, 204). Polish scholars also took an interest in this matter, with Warsaw hosting the earliest and most prominent studies, best illustrated by the *Szkoła Główna* ('The Main School'), where there was a distinct concentration of such Slavonic studies. The *Szkoła Główna* institution was opened in 1862 – only to be closed (by the occupying Russian government) in 1869 (Labuda 2000, 167-68; Godłowski 1985, 143-54; Godłowski 1999, 55).

During this early pioneering period, two main matters concerned the scholars: the question of autochthonism, or Slavonic origins and the study of Slavonic Germanisation (with particular reference to the Western Slavs living between Odra and Łaba rivers). The question of autochthonism was to involve, in the main, scholars of languages; while the study of Germanisation was to concentrate upon the development and history of political phases and states in the West Slavonic region (Godłowski 1999, 56). Such early Slavonic studies mostly involved the 'descendants' of the *Szkoła Główna* (and were thus linguists and philologists rather than historians) and private scholars, who concentrated upon local archives and debated and published within socio-political periodicals such as *Ateneum*, *Niwa* and *Biblioteka Warszawska* (Labuda 2000, 168).

In the Russian-dominated University of Warsaw, Slavonic studies were pursued by Adolf Pawiński, who wrote (in Russian) the first Polish outline of the Western Slavs. Within the Warsaw academic environment were also Edward and

Wilhelm Bogusławski. Edward concentrated on general and early Slavonic studies (and the Southern Slavs) and Wilhelm concentrated upon the Western Slavs. Józef Perwolf, a philologist of the Slavic languages, also studied the history of the Western Slavs of the Baltic rim and wrote the important *Giermanizacija Bałtijskich Słowjan* ('The Germanisation of the Baltic Slavs') in 1876 (Labuda 2000, 168).

Pan-Slavism

The topic of ethnic differences on the eastern frontier was not actively pursued by the early scholars of Slavonic studies. They may have actively avoided this topic from fear that such studies would provoke and provide for the arguments surrounding the national aspirations of the Lithuanians, Byelorussians and Ukrainians. However, it may have been largely due to an overall sense of a Slavonic community – after all, the Polish antiquarian from the Russian sector cooperated with the Russian antiquarian in realising many common interests. In principle, their studies were restricted to the idea of pan-Slavism and the interpretation of the examined finds as Slavonic. The issue of the possibility of the archaeological interpretation of the differences between the Western and Eastern Slavs was not dealt with (Rączkowski 1996, 198).

This idea of pan-Slavism originated in the Romantic period of the late 18th and early 19th centuries and was expressed by the shared heritage of languages, tradition, customs and social organization. This in turn was thought to be a sufficient basis to create one uniform and independent Slavonic country or group of such countries – an idea used by various politicians who saw the future of the Slavs in one country or a federation of independent countries (Rączkowski 1996, 198-99). Unsurprisingly, this idea proved of most interest to Russian politicians, who saw Russia as the natural leader of this organisation; one reason why politicians of other nationalities did not consider the idea too seriously. In general, pan-Slavism was anti-German in character. However, pan-Slavism was an inspiration for those antiquarians who were interested the early pagan culture of the Slavs – and its anti-German character a role model in

the contradiction of German views concerning the ethnicity of the western region of Poland (Rączkowski 1996, 199).

Slavonic studies at this time were dominated by political considerations – several scholars (such as Wojciech Kętrzyński and Oswald Balzer) argued for a return to objectivism, without the passionate and unscientific approach to history that had previously prevailed. Unfortunately, most scholars were still under the influence of the nationalistic view of political opinions – and the study of the autochthonism of the Slavs in Central Europe played a very important role for the Polish and Czech peoples during confrontations with the German occupation or jurisdiction (Godłowski 1999, 57-58).

Wachowski studied the linguistic elements of autochthonism theory and was exceptionally critical of what he saw as simply political dilettantes – he was particularly critical of the unilateral historical generalisations of Wilhelm Bogusławski, author of the seminal *Dzieje słowiańszczyzny północno-zachodniej aż do wynarodowienia Słowian Zaodrzeńskich* ('A History of the North-Western Slavs up to the moment of denationalisation of the region behind the river Oder') (Poznań 1887-1900). Wachowski published *Słowiańszczyzna zachodnia – studia historyczne* ('The Western Slavs – A Historical Study') in 1903 (reprinted 2000). This pioneering publication was innovative from both a methodological and historical viewpoint, reviewing both the source material and considering the Western Slavs (such as the Polabian and Pomeranian Slavs) independently for the first time, without the formulaic political history of the time. Wachowski's work paved the way for future West Slavonic studies and gives him a significant status in the canon of Polish historiography. He provided Slavonic studies with a broader methodology and expanded the traditional subject matters to include such subjects as Slavonic common law (Labuda 2000, 168-69).

This discussion concerning the origins of the Slavs (autochthonism) rumbles on to this day. There are many theories and antagonists. Generally, there are many variants of two main concepts. The 'West' concept locates the homeland

of the early Slavs in the north part of Central Europe, mainly around the rivers Vistula or Oder (and occasionally including the Łaba). The 'East' concept locates the homeland of the early Slavs in the east, with suggested regions including the mid and high reaches of the river Dniepr and even as far afield as Central Asia or the Far East. Special origin hypotheses also abound, such as that involving a small region in the Carpathian Mountains.

Discussions not only concern the geographical location of the Slavonic homeland but also the date of their expansion. Some scholars limit dating to only a few centuries before the first mentions of the Slavs in historical sources, but others date the expansion to the 2nd and 3rd centuries BC or even earlier. The early dates are entwined with studies concerning Indo-European origins and the separation of languages (Godłowski 1999, 54).

The most difficult factors involved within the discussion or study of Slavonic origin, except for the lack of historical sources, are emotional attachment and non-academic agendas. Of course, such loaded interpretation is the very stuff of history – a relevant Polish example would be the *Cronicae et gesta ducum sive principum Polonorum* ('Chronicles and Deeds of the Dukes or Princes of the Poles'), written around AD 1115 by Gallus Anonymus on behalf of the Polish royalty – but, unfortunately, historians of the 19th and 20th century have not been free from this kind of political interpretation. The patriotic aspirations and ideals of scholars have burdened not only the study of Slavonic origin and their early history but also tainted the writing of histories of the different Slavic nations (Godłowski 1999, 54-55).

Thus, in the early 20th century, autochthonism met with much critical objection, generally from non-Slavic scholars and from German academics particularly, who had different approaches to the subject of the origins of ethnicity. Such objections were based on critical arguments in regard to the emotional and political interpretation of historical sources discussed above – but also (and more crudely) as a result of an anti-Slavonic tendency. Scholars who succumbed to this tendency (whether consciously or not) were looking to

history to substantiate German expansion and propagate the superiority and glorification of the Germanic culture and people. The Slavonic culture and people were often condemned as a race of little value, with a feeble culture and unable to achieve stable political independence without the intervention the foreign rulers (Godłowski 1999, 58).

Aggressive 'discussions' followed that were not grounded with real scientific discipline – the academic study of Slavonic autochthonism veered from vitriolic scholarly debate towards an acute political problem. Generally, this important historiographical battle involved Polish and German academics (with occasional input from Czech scholars) and was roundly ignored by the rest of Europe (Godłowski 1999, 58).

The 20th century

Gradually, both Polish and German academics started to turn their attention towards the necessity for a much more serious analysis of the archaeological evidence rather than concentrating upon the written historical sources and linguistic studies. The growth of archaeological cultural evolutionism and diffusionism provided the theoretical basis for such considerations. An early example of this is the German prehistorian Rudolf Virchow (1821 – 1902), who recognised the value of archaeological material cultures and concluded that there were two periods of habitation in the region between the Elbe and the Vistula. The older period was the counterpart of what is known today as the Lusatian (Łużycka) culture and was taken to represent the proto-Germanic or Germanic tribes. The younger period was connected with fortified settlements and pottery decorated with wavy ornament (which is now recognised as dating to the early medieval period) and was seen to confirm later Slavic colonization. Consequently, a powerful political argument was raised in regard to the Prussian sector of Poland – that the suppression of Polish national identity and promotion of Germanisation was merely a process of re-Germanisation. Obviously, Virchow's views did not meet with agreement with Polish academics (Rączkowski 1996, 201).

The culture-historical approach was further developed by Gustaf Kossina (1858 – 1931). Inspired by an almost fanatical patriotism, culminating in the publication of *Die Herkunft der Germanen* ('The Origin of the Germans') in 1911, Kossina formulated the methodology of what he called '*Siedlungsarchäologie*', or settlement archaeology method. Like many other contemporary archaeologists, including Montelius, Kossina believed that an archaeologically defined prehistoric cultural continuity indicated an ethnic (or racial) continuity, which made it possible to interpret every archaeological culture as part of the record of a particular ethnic group (Trigger 1992, 166).

Kossina declared archaeology to be the most national of sciences and the ancient Germans to be the noblest subject for archaeological research. He was directly inspired by the Romantic idea of material culture as reflecting the '*Volksgeist*' (the 'national soul') (Curta 2002, 202). He pilloried fellow German academics for their unpatriotic interests in classical archaeology. His work and methods were innovative and revolutionary (he was the first to use the concept of the archaeological material culture systematically), but the objectives were certainly the nationalistic promotion of the Germanic race at the expense of the Slavs and all other peoples. He developed the use of archaeological distribution maps – but based his research upon museum collections, only excavating once in his career (Sklenář 1983, 148). Trigger notes in *A History of Archaeological Thought* that *Die Herkunft der Germanen* "was a mixture of important theoretical innovations and a fanciful glorification of German prehistory as that of a biologically pure master race" (1992, 164). Kossina identified cultural and ethnic variations with racial differences, specifically promoting the antiquity and superiority of the Nordic (or Aryan) racial group. By claiming maximum antiquity for the cultural chronology of Germany (tracing the ethnic roots back to the early Mesolithic Maglemosian culture found in northern Germany), he sought to demonstrate that this region had been the centre of cultural development for Europe and the Near East (Trigger 1992, 166).

German nationalists viewed archaeology as a method of establishing a historical right to territory. Thus, wherever allegedly German artefacts were discovered, the area was declared ancient German territory, which modern Germany either held by right or was entitled to win back; unsurprisingly the same argument did not apply to the Slavs, who had settled as far west as Mecklenburg. Although Kossina died in 1931, his interpretation of German prehistory became the main component in the curriculum that the Nazi government adopted for teaching prehistory in German schools and his disciples took prominent positions within the Nazi regime (Trigger 1992, 164). The attitudes of the Kossina school were embraced by the Nazi ideologues and archaeology was elevated to the rank of an 'official science' in the Third Reich, laying the foundations for Nazi theories of their 'master race' (Sklenář 1983, 159). In Russia, in response to the Nazi threat, the study of Slavonic autochthonism or ethnogenisis was the major (perhaps only) research topic of Soviet archaeology and was used in propaganda as a symbol of national identity (Curta 2002, 209).

While the Second World War brought most archaeological research in Germany to a close, it also led to nationalistically driven excavations in occupied territories. In Russia, for example, an *SS-Sonderkommando* ('special unit') was charged in 1942-43 with recovering prehistoric 'Germanic' remains in southern Russia and the Caucasus. Nazi academics and archaeologists also took over museums in Poland and Czechoslovakia and reorganized the collections to reflect their own ideology. The new management of the museum of Łódź 'evacuated' coin hoards and Bronze and Iron Age artefacts (and the Biała urn, a local find dating to the third century AD, picked out because it was decorated with swastikas) to Germany. Many have never been seen since (Bahn 1999, 218-19).

The *SS-Ahnenerbe* was founded in 1935; its full title was the *Deutsches Ahnenerbe: Studiengesellschaft für Geistesurgeschichte* ('German Ancestral Heritage: Society for the Study of the History of Primeval Ideas'). The *Ahnenerbe* was headed by Nazi ideologist Alfred Rosenberg and security chief

Heinrich Himmler. Public money was poured into archaeological research and publication of finds; the aim of the exercise being to establish the antiquity of German settlement across a great swathe of the continent. Internal power struggles within the Nazi party eventually brought about a split in the official patronage for archaeology. While Rosenberg was interested in pursuing his radical theories, Himmler's instinct tended more towards the romantic and the occult, treating the German past as part of an all-embracing national creed with its roots in racial identity. The *Ahnenerbe* sponsored large, well-funded, professional excavations, such as those at Hedeby in Schleswig-Holstein (Bahn 1999, 216-18).

Poland

The conclusion of the First World War in 1918 resulted in the return of Poland as an independent nation – and it was not without its own nationalistic brand of archaeology. The new Poland was not nationally homogeneous: within the new territory there were also Ukrainians (14.3% of the population), Jews (7.8%), Byelorussians (3.9%), Germans (3.9%) and other peoples including Lithuanians. A report from 1921 shows that more than 30% of the population of 27 million were from these non-Polish ethnic groups; in eastern Poland only 37.9% of the population were Polish (Buszko 1988, 235).

The growing national aspirations of the minorities inhabiting the eastern part of Poland did not conform to Polish policy and the control of the provinces in question was often based on violence. There was also a tendency to promote Polish culture within many types of institutions, such as educational institutions, the Catholic Church and the Orthodox Church; we can see an emphasis at this time within Polish policy to promote the close bonds between these eastern provinces and Polish culture. However, these aspects are reflected more within history and literature than with archaeology. The development of nationalistic archaeology within Poland concentrated upon defining the differences between Slavs and Germans, rather than emphasising differences between the individual Slavonic ethnic groups in the east (Rączkowski 1996, 202).

The agreements resulting from the Treaty of Versailles did not fulfil the ambitions of many Polish politicians and journalists, with the new territory gained from Germany not quite reflecting the historical borders of Poland. They were also aware of the menace that could result from the frustration of German politicians after the considerable loss of the former eastern German province. Indeed, at first the Germans did not accept these revised eastern borders. Their demands that the borders should be revised and the German minority in Poland be protected did not offer much in the way of reassurance concerning regional stability. They also put great emphasis on the national consciousness of their countrymen living in the Polish territories. This led to irrevocable conflicts and disagreements. Archaeologists relished the opportunity to take part in these discussions, finally feeling able to engage in open battle with those German archaeologists propagating their own nationalistic archaeology (described above).

Polish archaeologists, for the first time, could work in independent and entirely Polish scientific institutions. Important archaeological centres were established in Warsaw, Krakow and Lvov, continuing the tradition of Slavonic Studies. Poznań played a significant role in this new archaeological sphere, being also the main centre of western Polish studies. This was both a result of the city's experiences during the Partition period and of a general anti-German attitude within Polish society in the Wielkopolska region (Rączkowski 1996, 204).

During the years between the first and second World Wars and those years immediately after, Polish academics such as Kostrzewski developed the theory of neoautochthonism. This located the Slavonic homeland between the Wisła and Odra rivers and dated the presence of early Slavs in this region from the prehistoric Lusatian (Łużycka) culture – claiming the earlier inhabitants of the region as proto-Slav just as German academics were claiming the same as proto-German. After the Second World War this new 'West' autochthonism theory was officially accepted. A commonly held conviction of the time was that Polish archaeology had successfully demonstrated the origin of Slavs as

entwined within the Polish territory – confirming the Polish right to occupy the disputed western region, proof that was used both socially (within academic argument for example) and politically. Unfortunately, this attitude proved disadvantageous in connection to the study of the Western Slavs as an individual group (Godłowski 1999, 59).

The 'East' autochthonism theory was subsequently generally abandoned and almost forbidden. Archaeologists did not involve themselves with these studies until the late 1970s. Indeed, to this day, Polish archaeology is still not free from such deeply rooted previous traditions and there has been little modern discussion, although the 'East' autochthonism theory has been generally accepted as the more likely and sensible argument (Godłowski 1999, 60-61).

Returning to the Polish-German discussion on ethnic issues in prehistory, the arguments resumed after the First World War and soon acquired an emotive and nationalistic character. Professor Józef Kostrzewski, a Polish archaeologist from Poznań University, was deeply involved. His background included an upbringing within a truly patriotic Polish family *and* of being a student of Kossina. He was emotionally committed to the problem of the Polish western borders and of the situation of Poles within Germany. His many newspaper articles defended the Polish character of Silesia and Pomeranian regions and created much controversy and polemics among the German archaeological establishment – where, despite many critical responses, Kossina's views and methods still prevailed. The firm conviction that the provinces on the Oder and the Vistula had pre-German or German character in prehistory was still the premise for the argument that the western Polish territories should be returned to Germany.

Kostrzewski also used Kossina's methods in his work refuting the views of the German archaeological establishment, but with certain modifications. He accepted Kossina's view that the archaeological culture was an equivalent to a separate ethnic group. However, he did not make this principle universal, as he claimed that subsequent archaeological cultures can reflect various stages in

the evolution of an ethnos, provided they have common features. Thus, not every new archaeological culture was seen as equivalent to a new ethnos. Kostrzewski felt that particular attention should be focused on the continuity, durability and transformation of archaeological cultures – and not only on their appearance and disappearance. Old finds could be considered Slavic on the basis of the uninterrupted evolutionary course of change in form, working backwards from a familiar ethnic situation in the early medieval period with the application of the retrogressive methods. Kostrzewski discerned a cultural continuity in the archaeological material from the Oder and the Vistula tributaries from early medieval period back to the late Bronze Age/early Iron Age Lusatian culture. As result, he identified the Lusatian culture as the equivalent to the pre-Slavs (Rączkowski 1996, 205).

Of course, there were not uniform views on the question of the ethnogenesis of the Slavs among either the Polish or German archaeological establishments. For instance, an archaeologist from Warsaw, Włodzimierz Antonowicz, tended to accept some moderate German concepts. Such ideas could be accepted in Warsaw, whereas it was not likely to happen in the Wielkopolska region. The political scientific polemics were enthusiastically engaged mainly by Józef Kostrzewski on the Polish side and Bolko von Richthofen on the German side (Rączkowski 1996, 206-207). These polemics would not have had much impact upon the popular public consciousnesses of Poland and Germany had they be simply fought out in the relatively restricted arenas of scientific journals. However, the articles that were published in newspapers and popular scientific magazines and brochures played a major part in formulating national stereotypes and divisions. It is also worth noting that both sides of the discussion used not only scientific arguments to prove their points and fan the flames of argument: emotional and personal attacks were also common (Godłowski 2000, 50-57; Rączkowski 1996, 207).

The discovery of a settlement of the Early Iron Age at Biskupin (in the north-eastern part of the Wielkopolska region) in 1933 was of immense scientific and propaganda importance. This very well preserved fortified settlement of the

Lusatian culture made a great impression both on archaeologists and on the public. The excavation began in 1934 under the direction of Kostrzewski and Rajewski from the University of Poznań and continued, growing in scale, until the outbreak of the Second World War.

Kostrzewski believed that the inhabitants of Biskupin were ethnic Slavs, a view that incensed his German opponents but came to be widely publicised in Poland. The excavation generated enormous public interest, on account of its scale and the exceptional preservation of the settlement and artefacts recovered. The waterlogged conditions meant that an extraordinary range of wooden and bone artefacts were found, including ploughs, carts, dug-out canoes, looms, ladders, ladles and awls. For the first time in central Europe, the environmental evidence and economy were scientifically investigated, revealing the existence of wheat and other crops and a range of domestic animals.

Polish excavations ceased on the outbreak of the Second World War and Kostrzewski, perhaps sensibly, fled underground when the Nazis invaded. In 1940 the *SS-Ahnenerbe* was placed in charge of new investigations. While Kostrzewki had concluded that Biskupin had been abandoned because of flooding, the SS archaeologists maintained that its inhabitants had fled because of the 'violent southward expansion' of Germanic invaders of manifestly military and physical superiority (Bahn 1999, 221).

War brought to the excavation of Biskupin many losses. Many of artefacts were lost and part of the excavation archive was destroyed – not to mention the untimely deaths of eight of the original excavation team. The *SS-Ahnenerbe* even went as far as deliberately destroying the remaining unexcavated areas of the site (Sklenář 1983, 162).

After the war, the political connotations of the site at last began to fade. Excavation was recommenced in 1946, directed by Zdzisław Rajewski under the aegis of the Polish communist regime, to continue until the early 1950s. Biskupin was then developed as an archaeological tourist attraction, drawing

busloads of Polish schoolchildren and an increasing number of foreign tourists each year. Part of the rampart has been reconstructed, alongside the gatehouse, two streets and two rows of houses. Biskupin became a well-known symbol of the prehistoric culture of Poland's ancestors.

Communism

After the Second World War, the borders of Poland were again redrawn, with the country effectively shifting west. The radical changes to its borders were brought about entirely by political decisions made in Yalta and Potsdam. Ethnic aspects or 'historical rights' to certain territories were of no importance and were not considered. Poland became an independent nation once more, although with only a very small percentage of its population being non-Polish. Abandoned to the Soviets, the new political situation in Poland determined both the tasks and the possibilities for archaeology.

Discussion of the lost territories in the east became taboo for political reasons. It was unwise to undermine 'the always right decision taken by the great friend of Poland' Józef Stalin. All kinds of publication, including the scientific ones, were subject to proscriptive censorship at that time. Historical and contemporary ethnic and cultural differences between Poland, Byelorussia and the Ukraine were not allowed to be explored and subsequently emphasised – although the 'great Slavic community' that was the Eastern Bloc certainly drew inspiration from the pan-Slavic ideas of the second half of the 19th century (Rączkowski 1996, 209). The search for evidence of the 'great Slavic community' did, however, release massive Soviet state investment into archaeology in the 1950s (Curta 2002, 211).

Archaeology within the Soviet Union became focussed upon Slavonic ethnogenesis and the Slavonic role in the forging of the Kievian Rus. It was deemed important to display the origins of Slavonic civilisation before the influence of the Vikings – and certainly independent of German influence (Shnirelman 1996, 234). Politics, nationalism and archaeology converged.

Similarly, archaeology and history in Poland were charged with the task of justifying the Polish right to the regained territories in the west. The idea was to prove to the world that Poland had just historical rights to the possession of Silesia, the Lubusz Land and Pomerania. It also became necessary to convince the understandably uncertain Polish people that the new territory of Poland was final and permanent – and the result of historic justice. The great importance placed upon historical right is clear from this extract from a speech made in Silesia, one year on from the end of the war, by Władysław Gomułka, then leader of the Polish Communist Party:

"Great historic events have let our generation return to the soil of our ancestors, the soil of our fathers... Coming here you have returned to the soil that is yours, as hard-working landlords of this soil. You have accepted it as your patrimony. The Germans could have Germanised those provinces by means of violence and oppression, a longstanding policy of denationalisation and colonisation, but there is no way of Germanising history. Nothing and nobody can deny the fact that Polish Slavic Piast tribes lived here many ages ago... Therefore, we do have the right to speak up and claim in the eyes of the whole world that we have returned to our soil as its only rightful owners" (1964: 135-36) (after Rączkowski 1996, 211).

The priority in archaeological studies at that time was to show the role of native elements in creating the culture and the statehood of Poland in the western regions of Wielkopolska, Silesia and Pomerania. Some archaeologists worked directly under the influence of Polish political leaders. The authorities readily allowed money for research projects that were to confirm the Polish character of towns from the 9th to 11th century – and the intensification of studies on the history of Poland in the early medieval period was related to the approaching millennium of the Polish state. Discoveries relating to the civilisation of the Polish inhabitants of towns and early municipal centres (especially those in the western 'Regained Territories') were always highlighted, as was the role of native elements in the (preferably independent) process of state development in Poland (Rączkowski 1996, 211).

The scientific views worked out between the 1940s and 1960s were clearly reflected in school textbooks, which had to present the country's past according to the doctrine of socialist ideology. References to the latest research results were used to support proposed syntheses. However, it was historians, not archaeologists, who created the accounts of early medieval Poland that were found in school textbooks. Out of all the archaeological achievements, it was only Biskupin that found a place in the history textbooks (Rączkowski 1996, 212).

After the conclusion of the celebrations surrounding the thousandth anniversary of Poland in 1966 (and the associated emphasis on archaeology proving statehood), the gradual general political stabilisation in Europe allowed archaeologists to focus on modern scientific discipline without paying lip service to party propaganda. Of course, the realities of life within the Eastern Bloc ensured that pan-Slavic ideas were still politically encouraged: witness the First International Congress of Slavic Archaeology, held in Warsaw in 1965, undoubtedly organised only with the assent of the Soviet authorities. Archaeological papers could still be banned by the censors – Godłowski's paper *W sprawie 'nihilizmu etnicznego' w archeologi* ('Concerning the subject of ethnical nihilism in archaeology') (2000) was originally written in 1972, but the views contained within regarding Slavonic origins were not approved. However, from the 1970s onwards, Polish archaeology ceased to play an ideological part in the process of creating national identity. Views about Germanic settlements in central and southern Poland now only provoke discussion among academics (e.g. Dulinicz 2001, 13-14) and do not generate the newspaper columns of old.

This brief overview of the development of Slavonic studies within history and archaeology illustrates the direction which the historiography of the study of the Western Slavs and their towns has taken. The academic study of the independent nature of the Western Slavs and the growth of towns in this region is a relatively recent development when compared to that of the Vikings in their Scandinavian homeland. Of course, the archaeological study of these towns

has greatly benefited from these political factors (witness the Communist state encouragement of archaeologists to excavate within 'Polish' towns in the western regions). However, to consider the development of the study of this period in this region without a good understanding of the nationalistic political factors involved would be dangerous. The background must be understood when considering antiquarian reports and the reasons behind the distribution of evidence gathered in the archaeological record.

Direction of the research

This thesis will study primarily the archaeological and historical evidence for standardisation within the trading networks of the early medieval period of the Baltic Sea. A general discussion will follow this introductory chapter concerning the theory and concepts behind the archaeological study of early medieval economic systems. It considers archaeological theory in relation to trade and exchange, standardisation and measurement and money and currency. It then focuses on the theory relevant to the growth of markets and towns in the early medieval period in the Baltic region. This discussion sets the scene for a wider general description of the context of contemporary European trade networks and commerce – with a particular focus on the Baltic Sea and the region inhabited by the Western Slavs. The role of merchants will be explored, alongside a discussion of the main commodities in which they traded. There will then follow a general description of the archaeological and historical evidence for standardisation within the commodities traded and within the machinations of trade. This description begins with the known evidence for standardisation within the Baltic – the weight systems in use at the time – before discussing those non-bullion commodities that may display evidence of standardisation.

These general descriptions will form the context for the following chapters, which will explore the various aspects of standardisation within the evidence provided by Western Slavonic pottery. The pottery types, their distribution and the mechanisms affecting the archaeological recovery are described. The

methodology employed by the study is reported – and then the results of the study are examined.

The evidence for standardisation provided by Western Slavonic pottery has been chosen for several reasons: the topic has not yet been approached as an archaeological study (unlike the weights and weight systems in use at this time); and the material has an unusually wide distribution around the Baltic Sea region. The thesis will conclude with a discussion of the social and economic implications of such pottery standardisation, setting this important regional phenomenon into the wider context of the Baltic Viking Age.

Theory of early medieval economic systems

"*It is not unfitly that money itself is stamped round, because it remains not still.*"

St Augustin (AD 354 – 430) On Psalm LXXXIV

This chapter contains a general discussion concerning the theory and concepts behind the archaeological study of early medieval economic systems. It considers archaeological theory in relation to trade and exchange (including value systems, gift exchange and barter exchange); standardisation and measurement (including anthropomorphic measurements, representational measurements, early medieval Slavonic measurements and a discussion of the role of a centralised authority in establishing and confirming measurements); and money and currency (including a discussion of the role of hoards and hoarding within the archaeological record). It then focuses on the theory relevant to the growth of markets and towns in the early medieval period in the Baltic region, allowing the following chapter to describe the context of such towns and markets within the contemporary European trade networks and commerce.

The history of the study of early medieval economic systems

The foundation of any discussion of economic systems is the basic premise that an economy involves production, exchange and consumption. In many cases, particularly those discussions relating to short distance or regional economies, the focus of debate rests with production of goods and trends of consumption. Means and methods of exchange – including ideas of value – become much more important in discussions regarding economies involving long-distance trade, where separate cultures are involved.

The study of early medieval economic systems of trade and exchange is closely tied to the archaeological investigation of urban sites. The early

scientific excavations of Birka (1871 – 1890) and Hedeby (1900) led to the recognition of trade and settlement in the Baltic region before the historical birth of towns seen through legal documents and charters. Schuck suggested that the definition of a town be freed from simply that tied to a documentary framework, stating that a town should be considered "a fairly dense settlement, whose inhabitants, by reason of their common trading interests, formed a social entity in economic or in legal terms, or in both" (Schuck 1926). This enabled the archaeological evidence to be investigated without reliance upon borough, market and town charters. However, historical social frameworks were often still employed, most notably in the work of Henri Pirenne (1939). The Pirenne Thesis disputed the then commonly-held belief that the end of the Roman Empire in the 5th century AD precipitated a rapid decline in the fortunes of its territory and inhabitants, arguing that the evidence pointed to continuity of the economy of the Roman Mediterranean after the barbarian invasions. Pirenne argued that the Islamic Arabic expansion in the 7th century resulted in a cessation of economic links between Europe and the Near and Far East. This initiated a steady decline and impoverishment, with a loss to Europe of luxury items and the wealth generated by trade. Pirenne argued that, by the time of Charlemagne and the Frankish Empire, Europe had become entirely agrarian at a subsistence level, with no long-distance trade – and that the rebirth of towns and trade in Europe went hand in hand with feudal authority (based on agricultural activity) and fortified settlement. The Pirenne Thesis has been analysed many times since, most notably by Richard Hodges (1982; Hodges and Whitehouse 1983), who introduced and popularised the idea of *emporia* when describing primitive markets of the early medieval period. The most recent comprehensive analysis of the subject, *Origins of the European Economy* (McCormick 2001), details how archaeology and modern historical study has transformed our knowledge and understanding of the period.

However, before concentrating upon early medieval markets and the growth of towns around the Baltic Sea region and in northern Europe, we shall first

explore the theory and concepts behind the study of trade and exchange; standardisation and measurement; and money and currency.

Trade and exchange

Exchange is a central concept within archaeology. When referring to material goods, to commodities, it means much the same as trade. But exchange can have a wider meaning, being used by sociologists to describe all interpersonal contacts, so that all social behaviour can be viewed as an exchange of goods, non-material as well as material. Exchange in this broader sense includes the exchange of information – exchange is a form of social communication and the transfer of material goods is only one aspect of this. There are many different forms of exchange on many different social levels. Thus, when considering a regional network of trade and exchange (extending over the boundaries of many politically independent societies), one must take account not only of the raw materials involved (many of which will not be visible in the archaeological record) but also the ideas and technologies that may have been exchanged and adopted.

Not only are there many different kinds of goods (from everyday commodities to prestige items), but there are many different relationships within a network of trade and exchange (merchant and craftsman, alien trader and native host, agricultural hinterland and central market place) and many different mediums of exchange (such coinage or non-monetary economy). Each exchange system or network is individual, but can be reconstructed (or at least the movement of goods can be investigated) if the materials in question are sufficiently distinctive for their source to be identified. It is often useful to distinguish between *internal exchange*, taking place within the specific society and *external trade* or *exchange*, where goods are traded over much grater distances, moving from one social unit to another. Renfrew and Bahn note that "in using the term 'trade', we [as archaeologists] generally mean external trade – something that

takes place with the outside world. But when we consider the interactions within a society, whether involving information or goods, we tend to use the terminology of social organisation not of trade" (Renfrew and Bahn 1991, 308). A further useful distinction to make is between embedded exchange systems (internal to a society – or, more loosely, local trade) and disembedded exchange systems (between regions). It is this disembedded trade that is usually most clearly visible within the archaeological record, for the indicators and mechanisms of trade and exchange are most obvious when spread over a large area.

The American historian Immanuel Wallerstein used the term 'world system' or 'world economy' to describe a large economic unit that is articulated by trade networks extending far beyond the boundaries of individual political units and linking them together in a much greater functioning unit. The idea of the 'world system' is a useful one – as long as one remembers the dynamic nature of the trade network being described and its composition of several independent parts.

Of these independent parts there are several models, such as gift exchange and reciprocity (primarily concerned with cementing social relationships), redistribution (primarily concerned with the internal exchange of a centrally organised society) and market exchange (where the emphasis is on individual profitable transactions within a distinct market place). This thesis is concerned with the latter. Market exchange can be based on the internally facing market place (where the market place is restricted to internal trade within the individual socio-political unit), the externally facing market place (where traders of different socio-political units can meet and conduct external trade) or the port-of-trade (an independent external market place where traders of different socio-political units can meet and conduct external trade).

Value

To be able to understand trade and exchange in the early medieval period we need to consider value and particularly the social attitudes that form it. Economic value, or those values expressed within any process of exchange, reflects the social organisations by which the exchange occurs. Appadurai wrote that "economic exchange creates value. Value is embodied in commodities that are exchanged. Focusing on the things that are exchanged, rather than simply on the forms or functions of exchange, makes it possible to argue that what creates the link between exchange and value is politics, construed broadly" (1992, 3). Georg Simmel provided, in his book *The Philosophy of Money* (1900), a systematic account of how economic value is best defined. He argued that value is not an inherent property belonging to an object or commodity, but is a dynamic subjective judgement made at the time of any exchange. Demand (which Simmel thought of as *desire*) creates economic value during exchange – value is generated as a result of exchange, rather than beforehand (Appadurai 1992, 4).

For a value system to operate effectively there must be a generally accepted standard of value. As described above, valuation is essentially a comparative process by which two unlike entities or commodities are compared with reference to these standards. Standards of value within a value system are generally accepted but are subject to fluctuation and change. Values are subjective and liable to change over time. Socially, however, the recognition of a standardised value indicates the identification of individuals with the group. Standardised (or accepted) values are of great importance within social development, from basic group identity through to complex systems of hierarchy. Indeed, the process of evaluation and value was crucial to the common phenomenon of exchange or barter. Of course, the adoption of a value system does not automatically imply that every exchange that occurs within the scope of the system adheres to its values. The degree of mutual

value coherence between parties within an exchange situation will vary between situations.

The anthropologist C A Gregory noted in his book *Gifts and Commodities* (1982) that value systems are not always economic – an idea that he developed further in *Savage Money: the Anthropology and Politics of Commodity Exchange* (1997). He describes the 'use-value' of a commodity as the intrinsic property of a thing in demand by a society at different stages in its historical evolution; and the 'exchange-value' of a commodity as the extrinsic or subjective value placed upon it at the time of exchange (reflecting the quantitative proportion of values deemed to exist between the commodities being exchanged) (Gregory 1982, 10-11). For example, metal ores (specifically gold and silver) often have both specific 'inherent' values (such as rarity) and symbolic social values (signifying authority or prestige, for example). Indeed, the gift of an item may have more social value attached to it than any perceived actual value, or the value of an item be measured for perceived supernatural, magical, mythological or religious reasons.

Symbolism can play an important role in any hierarchy of values and this is particularly true of metals. The symbolic value of precious metal is evident when seen in the context of items of authority, prestige and cult. Medieval examples with great social meaning include insignia of authority such as the crown, the sceptre, the royal orb and the ring; religious examples include richly-decorated crosses, reliquaries and books; and cult objects include items such as statues of pagan deities made of precious metals and stones (described in historical sources) (Dzieduszycki 1995, 158).

A commodity may be described as an object or raw material (even a service) that can be exchanged, bought or sold. In his paper *Commodities and the politics of power*, Appadurai argues that the methodological analysis of the commodities of exchange – the study of "their forms, their uses, their

trajectories" – allows us to interpret the human transactions and calculations involved (Appadurai 1992, 5). Appadurai employs a wide definition of the term 'commodity', criticising the narrow definition (often attributed to Marx) that describes a commodity as a product intended principally for exchange within a capitalist system. Appadurai argues that the term 'commodity' should be employed within a much wider framework, encompassing many different forms of exchange – he defines a commodity as "any thing intended for exchange" (Appadurai 1992, 6-9). This enables him to focus not on the product/production/producer of the commodity (as he feels many contemporary analyses of economy do) and concentrate upon the dynamics of the exchange itself. This approach enables the discussion of the economic and social values contained within commodity exchange over a much wider chronological period and within a range of different societies.

For example, using the basic premise of Marx's argument, gift exchange and commodity exchange are fundamentally contrastive and mutually exclusive. Gift exchange has often been seen as taking place between communities rather than within communities and, as such, 'foreign' or 'alien' external trade is seen to have preceded internal or social trade. Appadurai notes that "the tendency to see these two modalities of exchange as fundamentally opposed remains a marked feature of anthropological discourse" (Appadurai 1992, 11). He argues that there has been an oversimplification and romanticisation of both barter and gift exchange, noting that "Gifts and the spirit of reciprocity, sociability and spontaneity in which they are typically exchanged, usually are starkly opposed to the profit-orientated, self-centred and calculated spirit that fires the circulation of commodities. Further, where gifts links to persons and embed the flow of things in the flow of social relations, commodities are held to represent the drive – largely free of moral or cultural constrains – of goods for one another, a drive mediated by money and not by sociality" (Appadurai 1992, 11-12). Thus, the commonality of spirit recognised by Marx between barter and what he saw as capitalist commodity exchange (both being object or profit focused, relatively

impersonal and asocial) can also be extended to encompass gift-giving, where social reciprocity may also be impersonal and self-aggrandising. All forms of exchange fall within the basic definition of commodity exchange, where a 'good', 'object', 'product' or 'service' is deemed to have a value by the society or societies concerned. While many different 'goods', 'objects', 'products' or 'services' may be described as commodities in various particular contexts, the key aim must be to interpret and understand such commodities in motion – the mechanics of exchange.

Gift-exchange

One of the most fundamental advances of anthropological theory was proposed by the French sociologist Marcel Mauss in 1925 concerning the nature of gift exchange. He saw that in a range of societies, especially in those lacking a monetary economy, the fabric of social relations was bound by a series of gift exchanges. The gifts were not payments, transcending mere monetary consideration. The gift was a gesture and a bond, imposing obligation on both parties, especially upon the recipient, for the acceptance of the gift implied the obligation of repayment by another, equally munificent presentation. Mauss explained that the giving of gifts, or reciprocity, was a general principle applicable to all societies, indeed as the essence of society. There are three principles of gift-giving: the obligation to give, the obligation to receive and the obligation to return the gift. Gift-giving is both voluntary and a social obligation (Vestergaard 1991, 97-98).

Mauss argued that gift exchange is the exchange of inalienable things between persons who are in a state of reciprocal dependence. Inalienable items are 'loaned' rather than 'sold and ceded' and create an obligation to be returned, as opposed to what he saw as commodities (which, when exchanged, are transferred in ownership from one person to another and thus become alienated from the original owner). It follows from this definition of exchange

that commodity exchange establishes relation between the objects exchanged, whereas gift exchange establishes a relationship between the subjects (Gregory 1982, 19). The exchange of prestige goods as gifts was often used to cement social relationships between giver and receiver; the object of gift-giving not being in material 'profit' but in the social prestige attached to generosity and the importance of due social obligations or services. Gift-giving implies the reproduction of a social organisation; the distribution of jewellery, precious or symbolic objects, or even the giving of feasts served to affirm authority and leadership. Of course, Mauss provided only a very simplistic view of gift exchange, emphasising (and perhaps romanticising) the social relationships and obligations concerned and undervaluing the importance of the objects circulated.

There are two schools within economic anthropology – the formalists and substantivists. The formalists attempt to analyse all exchanges by reference to modern economists' concept of supply and demand and rational economic decisions about profit. For this analysis to work in non-monetary societies (and to some extent in monetary societies), profit and economy goals must be understood very widely to include social approbation or spiritual well being (Samson 1991a, 88).

The substantivist school of economic anthropology emerged with the publication of *Trade and Markets in the Early Empires* by Karl Polanyi (1957). The substantivist school holds that economic production, exchange and consumption cannot be analysed as an independent sphere of society. Exchange is *embedded* in social relations. As one moves into different social relationships one finds quite different transactions occurring and these transactions have as their purpose (just as much as the procurement of the exchanged item or service) the creation of new relationships or the maintenance of old relationships (Samson 1991a, 90). Polanyi distinguished between the two meanings of economic, the 'substantive' and the 'formal'. He

argued that the latter, comprising neoclassical (mainstream) economics, he argued "derives from logic, the former from fact" (Polanyi 1957, 243). Polanyi and his supporters (such as Dalton) set out to build a 'substantive' theory of economics from the historical and anthropological record, distinguishing three modes of transaction: gift-exchange or reciprocity, administered-trade and market trade. However, Sawyer, writing of early fairs and markets in England and Scandinavia, notes that the "theory has not so much been critically tested as buttressed by carefully selected examples" and is not now widely accepted by economic historians or anthropologists (1986, 60-61).

Following substantivist economic anthropology, Marshall Sahlins argued in *Stone Age Economics* (1972) that the distinction between gift exchange and commodity exchange should not be seen as distinct bipolar opposition but rather as the extreme points of a continuum. He felt that the key variable in the movement from one extreme to the other was 'kinship distance', arguing that gift exchange tends to be between people who are relatives, while commodity exchange emerges as the kinship distance lengthens and the participants become strangers (Sahlins 1972, 185-276). This argument is based on much anthropological research and echoes Marx's basic distinction between commodity exchange and non-commodity exchange (Gregory 1982, 22-23).

Gift exchange often invokes images of primitive societies (perhaps thanks in part to the substantivist economic anthropological studies of Polynesian islanders and Amazonian tribes). However, returning to the chronological scope of this thesis, there can be no doubt that gift-giving was of great importance within early medieval society throughout Europe – although it would be wrong to argue that all exchange took the form of gift-giving. The anthropologist George Dalton terms the specific tokens of wealth and prestige primitive valuables – but that such valuables and ordinary commodities were exchanged quite separately, in different spheres of exchange. He felt that within such gift-giving societies, commodities could also be exchanged against commodities,

with much less fuss, in mutually profitable barter transactions (Dalton 1967; Dalton 1971).

Thus, while economic anthropologists place much emphasis on social relations as the determining factor in gift-giving, rather than on the exchanged objects (commodities) themselves, the economic realities of the period in question cannot be explained without involving two practically autonomous systems – the socially-embedded gift-giving and prestige goods economy and the socially neutral exchange practised within the early towns and production sites.

Wealth in early medieval society was not simply the accumulation of gold and silver or other valued objects; it was reflected in social position, alliances and connections. The Scandinavian societies of the Viking period were built around the concept of gift-giving, a redistribution of wealth according to social status. The leaders and rulers within such gift-economies often relied on war, plunder and piracy to obtain the valuables that entered into circulation. Indeed, for the Vikings, the accumulation of wealth *did* require the simple accumulation of gold and silver, in order to continually demonstrate ones social position. The Viking traders who dealt with the Arabic merchants in the east were only interested in one thing: the Arabic silver dirham. These dirhams were melted down to provide the raw material required for jewellery and other high-status goods – it was essentially the grease that enabled the Viking society to operate.

In Old Norse societies the importance of exchange, or gift-giving, is very marked and there have been several studies of this phenomena. The Danish religious historian, Vilhelm Grønbech, writing on gift-exchange, noted that "when a gift is given and received into the hand of another, then a mutual pouring of life-blood occurs, binding people together with obligations like those of peace" (1912, 60). The Russian historian, Aron Gurevich, also writes of gift-giving, stressing that in Scandinavia a magico-religious dimension was added to the bonds established by gift-giving; the gift contained some of the qualities

of the gift-giver, especially luck. Other people could get a share of this luck by receiving a gift from the lucky one. Luck was deemed to manifest itself in all aspects of life such as the battlefield, raiding and in trade (Gurevich 1968, 129).

Gift-giving was an important institution in social organisation in the Viking Age and plays an important role in the Norse literature of the time. One skaldic poem after another, such as Iórbjorn Hornklofi's *Haraldskvæði* (*Hrafnsmál*) or Egil Skallagrimsson's *Hofuðlausn*, stresses the king as lavish and generous towards his men: he is the squanderer of gold, which in turn obligates them. In the sagas many conspiracies, alliances and feuds are based on problems related to gift-giving and exchange (Vestergaard 1991, 99). Another example, from *Njàls Saga*, describes that when Gunnar Hamundarson takes his leave of the Norwegian king, they exchanged a longboat and treasure for a rich wardrobe. The king prophesised that Gunnar will never return, amounting to an admission that their relationship was effectively over. Gifts were directly exchanged in an attempt to cancel any outstanding social debts, to wipe the slate clean (Samson 1991, 90).

Basically, gift or status exchange implies the reproduction of a social organisation; the distribution of jewellery, precious or symbolic objects, or even the giving of feasts served to affirm authority and leadership. The giving and receiving of gifts was the most important factor in establishing and maintaining social relations, including institutionalised payments such as dowries, gifts of loyalty, or blood money.

Barter exchange

Appadurai (1992, 9) defined barter is the exchange of objects for another without reference to money and with maximum feasible reduction of social, cultural, political, or personal transaction cost. The former criterion distinguishes barter from commodity exchange in the strict Marxist sense and

the latter from gift exchange by virtually any definition. Barter exchange is very difficult to distinguish within the archaeological record, but it certainly led to the formalisation of the development of measured value systems in any given society.

Standardisation and measurements

The development of measured value (and the accompanying metrology – the study of measured value) was usually the preserve of those seeking or exercising control and authority. The control of the articles of measurement (such as weights and scales) can be seen as an instrument of social control, their use a privilege to grant or deny – and their misuse a punishable offence. This kind of authority in early medieval societies commonly began with the control of the value of precious metals. Stability was expressed by common adherence to the rules and the use of different and complicated systems of measurements (Dzieduszycki 1995, 48-49).

In later periods merchant organisations such as the Hanseatic League guarded their separate systems (and individual coinage) as symbols of identity and freedom – just as the unification or wider imposition of measuring systems, such as the reforms of Charlemagne, was seen as an essential attribute of power and authority. For example, in 13th century Italy, when one city defeated another, the new authority was swift to impose its own system of measurements (Dzieduszycki 1995, 49).

Current standard measures signify nothing more than a common denominator for all dimensions measured – they are an invariable unit denoting, for example, measurements length, area, mass, time or exchange value. The fact that the kilogram indicates for the weight of ten cubic centimetres of water at the temperature of 0° centigrade, or that the metre is defined as 1/299,792,458 of a light-second now has no inherent social significance. Today, the overwhelming

majority of people who employ normal units of measures are ignorant of their original definitions and none are mindful of them when actually using such measures. By contrast, the measurements of early medieval Europe, 'primitive societies' and recorded folk measurements have a definite social significance that can explain the size of the units, their variety across space and in some cases, their mutability over time. They rarely display the scientific cohesion reflected, for example, in today's metric system – having been derived from individual phenomena rather than by overall convention (Kula 1986, 4).

This, the representational nature of historical measures (and especially those anthropometric examples discussed below), ensures that different measures are use in the measuring of different kinds of objects.

Man as the measure of all things

The Ancient Greek philosopher Protagoras (c. 481 – c. 420 BC) once asserted that 'man is the measure of all things'. This statement has a dual significance: it was the synthesis of the anthropocentric philosophical stance and perhaps also a declaration of cognitive faith; but it can also be taken as a simple statement of the existing systems, within which man used himself, the parts of his body, to measure all other objects (Kula 1986, 24). This concept was explored by the Polish historian Witold Kula in his book *Miary i Ludzi* (1970), translated into English as *Measures and Men* (1986).

The earliest stage in the development of metrological concepts is the anthropomorphic, where the most important measurements correspond to parts of the human body. These developed from simple measurements to more abstract concepts – this transition from concrete to abstract concepts of measurements may be described as from the particular *my foot*, *your foot* to the general *the foot*, *a foot*. Measures such as the *ell* (elbow), the *span* and the *foot* enjoyed currency in Western civilisation until relatively recently (dislodged by

the dominance of the metric system) but they had, of course, become standardised abstractions of the original (Kula 1986, 24-25).

Representational measurements and the adoption of measurements

The association between the adoption of particular measurements and the techniques of production and the productivity of labour is often readily apparent. For example, the width of the cloth is determined by the width of loom and the length of the piece of material also partly determined by technical considerations and partly by those relating to the social organization of production. The length of the piece commonly coming off the loom becomes the customary unit of length for that textile. Transport arrangements may also determine the units employed to measure certain products, some being measured by the *basket* and by the *wagon-load* or *boat-load*. Prices and taxes may be derived from such transport arrangements – and indications of standardised payments involving transport arrangements likely indicate standardised sizes and measurements. Finally, the requirements of the material produced may also determine the adoption of a measure: for example, the needs of preservation may ensure that a product is stored in smaller quantities than actually technologically possible. Thus the techniques of production, of labour, of transport and of storage may all influence the common adoption of a measure that could, over time, be adopted as a standardised conventional measurement.

Indeed, the social content inherent in any prevailing system of measurements served to ensure their longevity. Kula (1986, 5-6) notes that the conquered Gauls (renowned for their horse breeding) retained their own traditional measure of distance, the *leugae* (the later French *lieue*) of approximately four kilometres over the Roman mile (equal to 1,000 paces or double steps). Even the Roman administration of highways had to accept as official the region's

preference, marking on the milestones distances in *leugae* as well as in miles (and sometimes in *leugae* alone).

When 'official' standards were imposed and recognised by a ruling authority, they were often difficult to maintain. Although they were standards of the ruling authority, the copies that circulated could be subject to wear-and-tear, misuse, falsification or simply poor reproductive quality. Thus, there were often two types of measurement systems in use – the first applied to and was operated in everyday domestic life, while the second was administrated by authority, primarily in terms of taxes, tributes and toll payments (the second could also be developed using elements from the first). Both had subsequent effects upon standardised measurement systems used within trade and the market place. Some of these measurement systems could be developed from the first ('everyday') type, some could be developed from or imposed by the second ('authoritarian') type and some could be adopted from and introduced by 'foreign' systems encountered by merchants dealing with specific commodities. The later includes the Arabic weight system introduced to the Baltic by long distance traders in the early medieval period.

The most important factor in the adoption of authoritarian measurement systems is an established ruling authority – one with an interest in controlling trade and raising revenue. In the period under discussion – broadly the 9th to 11th centuries – and around the Baltic region, this was not always the case. The establishment of early kingdoms (and in some cases tribal organisations) was just beginning. However, early historical sources do record the tax-raising powers of the first Polish king, Mieszko I, in the 10th century.

Early medieval Slavonic measurements

During the early medieval period in the Slavonic lands a multi-layered system of measurements was developed, generally based on native estimations of value

and units of different types of goods, evidenced by linguistic studies and historical documentation. Measurements arose in various areas, such as units describing products or units of agriculture, distance and transportation, storage, taxes and trade. However, when external exchange began to take place on a large scale we begin to see influences of neighbouring systems of measurements, changing the traditional system of measurements to mirror more widespread conventional measurements (such as weight systems). The early units of measurement have a pattern of sizes and names from the human body (e.g. the foot) or human activities such as the methods or means of production (e.g. specific tools) (Giliewicz 1967, 204). Often, the early names and words of these units have remained in use, although the units that they described have changed. For example, early Slavonic farmers used the word 'kupa', or 'kopa', for collections of (at least from the 11th century) sixty units such as eggs. However, in use at the same time were different values of the 'kupa', the 'kopa chłopska' (or peasant kupa). These were commonly valued at 64, 72 and even 80 units, depending upon regional preferences. The 'tuzin' (or dozen) appeared around the same time (Giliewicz 1967, 205).

With the development of Slavonic measurements it is also possible to trace the development of mathematical knowledge (Giliewicz 1967, 205). An essential human mechanism of counting (and, for particular relevance to the market place, multiplication) is the hand, or rather, the fingers. Measurements such as those of distance were first roughly calculated, using, for example, the fingers and hand for short lengths and the shot of an arrow or travelling times for longer lengths; these estimates were gradually conventionalised. The massive corpus of linguistic evidence is not discussed further in this thesis; what is of interest is those categories of artefact from the archaeological record than can perhaps shed light on the beginnings of widespread standardisation and conventionalisation in units of measurement in the early medieval period of the Baltic Sea region.

The symbolic meaning of measurements

The idea of the 'measure' or 'standard' in Ancient Greek philosophy was inseparable from the concept of the 'mean' – and of justice. While Protagoras asserted that 'man is the measure of all things', Plato aimed to counter this argument, writing in the Laws: "now it is God who is, for you and me, of a truth the 'measure of all things', much more truly than, as they say, 'man'." Plato was advancing a philosophical concept which can be applied to the idea of 'measure' in a physical as well as an intellectual context. In terms of measure, or standard, it meant that things on the earthly level had to coincide as nearly as possible with the pattern on the universal level; measure, like justice itself, seems for Plato to be 'a pattern laid up in the heavens' (Wood 2002, 90).

The concept of weighing and measuring as divine standards (closely associated with justice and judgement) has been fundamental to the faiths of Christianity, Judaism and Islam – and earlier. Amon weighed the deeds of the ancient Egyptians in his scale, just as the Archangel Michael does for Christians. Religious authorities – and those rulers who reigned with divine authority, such as Christian monarchs – were usually quick to assert power in terms of ensuring that their own divine standards held sway in the market place. In Deuteronomy (25.13-15), the fifth book of the Hebrew Bible, part of the Torah and of the Old Testament and which constitutes a code of social conduct alongside sacred sanctions, the concept of weights and measures as divine standards is described: "*Thou shalt not have in thy bag divers weights, a great and a small. Thou shalt not have in thine house divers measures, a great and a small. But thou shalt have a perfect and just weight, a perfect and just measure shalt thou have: that thy days may be lengthened in the land which the Lord thy God giveth thee. For all that do such things, and all that do unrighteously, are an abomination unto the Lord thy God*" (Kula 1986, 9).

The eighty-third sura (or chapter) of the Koran, dating from the early Madinan period, also condemns 'the cheats' and metrological offences:

"*In the Name of God, the Compassionate, the Merciful*
Woe to those who stint the measure:
Who when they take by measure from others, exact the full;
But when they mete to them or weigh to them, minish –
What! have they no thought that they shall be raised again
For the great day?
The day when mankind shall stand before the Lord of the worlds."

Turning to the Bible, Proverbs 16, verse 10 perhaps most succinctly demonstrates the dual nature of measure in terms of divine and secular: "*A just weight and balance are the Lord's: all the weights of the bag are his work*".

An early example of the remit that this concept allowed described by Pope Gregory the Great who wrote, c. AD 600, on the standard prices that should be set for grain: "*We have learned that the serfs of the Church are grievously burdened in the matter of prices of grain, so that the purchase price fixed for them is not observed in time of plenty. And it is our desire that the standard purchase price be observed in their regard at all times according to the official prices, whether the harvest be great or small. Moreover, we desire by all means that the grain lost by shipwreck be accredited; yet so that there be no negligence on your part in the matter of shipping the grain, lest the loss arise from your failure to take advantage of a suitable time for shipping. Moreover, we have thought it very unfair and unjust that anything should be taken from the serfs of the Church in the matter of the setiers, or that they should be compelled to give a greater muid than... that which is brought into the granaries of the Church. Hence by these presents we command that never more than eighteen setiers be taken from the serfs of the Church for a muid of grain. Unless, perchance, there be something which the sailors are accustomed to*

receive over and above, because of the shrinkage in the shipping of the grain, as they testify" (translation after Cave and Coulson 1965, 127-28).

Measurements as an attribute of authority

The right to determine measures is an attribute of authority in all advanced societies, being the prerogative of the ruling authority to make measures mandatory and to retain the custody of the standards (these characteristics often being aligned with religious authority). The ruling authority often also seeks to unify all standards of measure within its territory and claims the right to punish metrological offences. The assumption by a ruling power of the power to determine measure is visible in the early regulation of the measurement of precious metals. In classical Greek antiquity measures, like coinage, were an attribute of the sovereign power. In Athens, the standards of weights and measures were in safekeeping on the Acropolis, additionally secure in their dedication to the gods. Newly emergent city-states created their own standards as symbols of their sovereignty, while those that had the misfortune to be conquered had the measures of the conqueror imposed upon them as symbol of the new domination In the early medieval period in north-western Europe the establishment of control of the weight systems, measurements and coinage coincided with the establishment of sovereign powers over a people (Kula 1986, 18).

One of the best examples is Charlemagne, whose standardisation of measures was integral to his general unifying policy. Although he did not create any new measures, he bestowed his sanction upon those already in existence and extended the area of their use (Kula 1986, 19). The model early medieval ruler, he also introduced an extensive reform of the coinage and sought to control trade bot internally and externally (with the use of trade treaties and embargoes). The Anglo-Saxon King Offa of Mercia (d. AD 796) established a uniform coinage, the silver penny, weighing 24 grams (which coincided with

Charlemagne's reform) and simultaneously established the Anglo-Saxon standard weight, the silver pound. Edgar the Peaceful (who ruled from AD 959-75) undertook a major reform of the coinage, seeking standardisation within coinage, weights and measures. After his reforms, coinage was reissued and the types changed every six years, combating fraud. Edgar specifically linked the standards of coinage and measurement: *"and let one money pass throughout the king's dominion; and that let no man refuse: and let one measure and one weight pass; such as is observed at London and at Winchester..."* (translation after Cave and Coulson 1965, 136-37).

In theory, the power of the monarch over weights and measures was absolute. However, imposing these standards at the local level was often difficult. In medieval England, the problem was recognised by Richard I – his *Assize of Measures* in 1197 made certain people in each city and borough responsible for enforcing and authenticating the standards, while in rural areas such responsibilities and their enforcement were an essential part of lordship. On some manors the scales were a manorial monopoly and the peasant would have to pay to use them. In the towns, during the fairs, tradesmen might be forced to use the municipal scales, or to rent them (Wood 2002, 96-97). Pope Gregory the Great wrote to his officials "*Above all, it is my wish that you should watch carefully that no one, in collecting charges, should use false scales. Should you encounter any such scales, destroy them and bring into use new true ones*" (translation after Kula 1986, 21). Similarly, in the Islamic world, the Umayyad Caliph Abd al-Malik (AD 685-705) recommended the issuing of glass weights for the purpose of testing coins, the idea being that the glass would not be "*susceptible to alteration either by augmentation or by diminution*" in that any tampering would be easily detected (translation after Miles 1948, 2-3). Officials were appointed to check on the glass weights in use on a regular basis – if one was found to be defective it would be destroyed and a replacement required to be bought by the merchant from the government official. Indeed, once official weights and measures were established by an authority, their use had to be

monitored and upheld. Regular inspection, verification and enforcement were required – and enforcement included punishment. One example of this, although an extreme penalty, was applied in Latvia in the 13th century: 'bad' measures were punishable by death, but only if the false *ell* missed the correct length by more then finger's breadth (Kula 1986, 21).

The connection between weights, measurements and coinage was a close one in the medieval period, for control of all of them was a part of the exercise of sovereignty. In *De Regimine Principum* (On the Government of Rulers), the Dominican scholar Ptolemy of Lucca (c.1236 - 1327) wrote that "*weights and measurements... are as necessary as the coinage for preserving the government of any lordship, since they are used in the payment of tributes, since their use decreases quarrels and protects fidelity in purchases and sales and finally since they, like coins are instruments of human life and even more than coinage, imitate natural action... it seems that weights and measurements take their origin from nature more then coinage does and therefore they are even more necessary in a republic or kingdom*" (translation after Wood 2002, 89).

Money and currency

Archaeologists and historians have long studied the economics of a culture or society as a means to develop understanding in regard to the social dynamics of the group concerned. One area of particular interest to both the archaeologist and the historian is the development and use of money, whether as coinage, bullion, ingot, tokens and notes; and of particular interest to this thesis is the development of various non-coinage monetary systems and systems of standardisation within trade. Weight units are often crucial within the development of units of bullion or ingots – and such measuring systems had social uses beyond simply setting the accepted bullion standard. Such systems often had great longevity and a wide geographical spread. The use of the

Arabic mitqal in the weight systems of the Viking Age and early medieval period in the Baltic region (discussed in detail below) is one such instance of cultural transfer, mirrored in the spread of the weights used in Mesopotamia, the shekel and the mina, which both become widespread in the Mediterranean world and were adopted by the Greeks in the early first millennium BC (Williams 1998, 22).

Indeed, such long distance contacts (and trade) in the Mediterranean presumably played a significant role in the development of the use of precious metal as money. While goods would have often been exchanged by barter, desired (and thus valuable) metals such as gold and silver would also have changed hands. They were valuable possessions in themselves and hence easily valued and exchanged against other goods. The fact that metals were not subject to short-term decay or to yearly fluctuation of supply (like grain) must have increased their usefulness for traders. Thus gold and silver, even in small amounts, could constitute an effective means of making actual payments, whether of a commercial, legal or social kind, because of their general acceptation over a wide area (Williams 1998, 22). As a useful medium of exchange it overcame the inconvenience of barter during long distance trade, where the transport of goods over long distances could be problematic and there could be great differences between the needs of potential sellers and buyers and the value of their goods.

However, just as today we deal with paper money, electronic money and money of account, money in the past did not necessarily have to take the form of coinage. The anthropologist Bronislaw Malinowski thought that "any article which can be classed as 'money' or 'currency' must fulfil certain essential conditions; it must function as a medium of exchange and as a common measure of value, and it must be the instrument of condensing wealth, the means by which value can be accumulated. Money also, as a rule, serves as the standard of deferred payments" (Malinowski 1921, 13-14). However, such

precise terminology restricts the definition of money to contain only modern ideas of money – in particular, those of value. Marcel Mauss argued in *The Gift* (1924), one of the earliest and most important studies of reciprocity and gift exchange, that (primitive) money is not necessarily merely a physical item, but also contains elements of social reciprocity. Dalton agrees, noting that primitive money performs some of the functions of modern money, but rarely all: "our money is impersonal and commercial, while primitive money frequently has pedigree and personality, sacred uses, or moral and emotional connotations" (Dalton 1967, 167).

The ancient Greek philosopher Aristotle (384 BC – 322 BC) in his works *Nicomachean Ethics* and the *Politics* laid the foundations for the two basic interpretations of money – as an artificial measure of value and as something of intrinsic value. In *Ethics* 'just action' is defined as "*intermediate between acting unjustly and being unjustly treated; for the one is to have too much and the other to have too little. And justice is a sort of mean state… because it aims at a mean, whereas injustice aims at the extremes.*" Aristotle also applied this meaning to economic exchange, trying to establish equality between the things exchanged. He recognised that exchange is the basis of economic relationships between people: "*money, then, acting as a measure, makes goods commensurate and equates them; for neither would there have been association if there were not exchange, nor exchange if there were not equality, nor equality if there were not commensurability.*" Aristotle describes money as a measure against which goods can be valued. They are valued must be according to the demand for them and the value of this demand is then measured by money. He noted that as a measure of value money is entirely artificial: "*'money' (nomisma)… exists not by nature but by law (nomos) and it is in our power to change it and make it useless*" (Wood 2002, 71-72).

Was money simply an artificial measure of value, given its own validity by the State, or did it have some inherent value of its own, due to its composition of

precious metal? In the *Politics*, Aristotle specifically notes the existence of the two views: that is that money is of intrinsic value and that wealth and money are synonymous; or that money is a sham and entirely a convention. Aristotle argued that as "*the supply of men's needs came to depend on more foreign sources as men began to import for themselves what they lacked and to export what they had in superabundance; and in this way the use of a money currency was inevitably instituted. The reason for this institution of a currency was that all the naturally necessary commodities were not easily portable and men therefore agreed, for the purpose of their exchanges, to give and receive some commodity which itself belonged to the category of useful things and possessed the advantage of being easily handled for the purpose of getting the necessities of life. Such commodities were iron, silver and other similar metals. At first their value was simply determined by their size and weight; but finally a stamp was imposed on the metal which, serving as a definite indication of the quantity, would save men the trouble of determining the value on each occasion*" (Wood 2002, 73).

Early medieval money

The availability and use of money in the medieval period changed so much and so often over time that it must be considered one of the key variables in our understating of medieval societies, along with population, religion and developing agricultural, industrial and commercial techniques. Spufford writes that a knowledge of the changes within the availability and use of money in medieval Europe "greatly clarifies our understanding of a whole gamut of political structures, from the shreds of centralised organisation inherited by the barbarians from Rome, though the most decentralised form of 'feudal' authority, to the earliest examples of the 'modern bureaucratic state' in the later Middle Ages. The study of money and its supply, therefore, has wide implications as well as, more obviously, assisting the historian concerned with prices and

wages, with the level and nature of rent, with interest rates or with the profit and scale of trade" (Spufford 1988, 1).

Of course, the study of money in the medieval period should not focus solely upon the coins themselves. Coins were only a part of the money supply and were supplemented by a variety of other transferable objects such as unworked precious metals and spices such as pepper. Indeed, intrinsically valueless tokens were sometimes used, such as handkerchiefs (see below). From the 12th and 13th centuries, coins were already supplemented in some parts of Europe by holdings in the public debt and by bank deposits. These were transferable, by entry in the books of the bank or those of the officials of the *monte*, by bills of exchange and, from the 14th century, by cheque (Spufford 1988, 1-2).

Thomas Aquinas (c. AD 1225 – c. AD 1274), the most celebrated theologian of the late medieval period, felt that the proper use of money was as an instrument of exchange: "*the prime and proper use of money is its use and disbursement in the way of ordinary transactions*" (translation after Wood 2002, 75). This was to have important implications for the doctrine of usury, for it was linked with the idea within Roman law that money was a fungible. Fungibles could be counted, weighed or measured, each individual unit being totally interchangeable and indistinguishable with another, because one unit could perform the service as well as another. As such, if they were borrowed, the same number, weight or amount had to be returned. The implication was that money too should be returned to its lender in the exact amount, without the lender charging interest. In this approach money seems to have been understood as something more than simply a fixed and invariable measure instituted by law. To better understand this approach one must first understand the contemporary situation, in which two types of money coexisted – money of account, appropriately labelled 'ghost money', alongside the actual money in circulation (Wood 2002, 75-76).

Ghost money

'Ghost money' is indeed an apt name for money of account, because throughout the Middle Ages most of it had no physical presence: it existed only in the mind and in writing. It is a measure of value used for accounting purpose and the value of other commodities, including actual coinage, would be measured against this standards. The system of money of account most common in medieval Europe was that of pounds, shillings and pence which was based on multiples of twelve (the duodecimal system), as opposed to ten (the decimal system). It was introduced possibly as early as the 7th century, but given prominence by the financial reforms of Charlemagne in the late 8th century. Charlemagne set up a new standard, the *livre* (from the Latin *libra*, the modern pound), a unit of both money and weight, for it represented a Roman silver weight then in use. He stipulated that 240 silver *deniers* (from the Latin *denarius*, the modern penny) should be struck out of every pound of silver. However, at the time the basic money of account was still the Roman *sou* (the Latin *solidus*, the modern shilling). In order to maintain continuity, Charlemagne had to include the *sou* and it was reckoned as 12 silver *deniers*. This meant that 20 *sou* were equal to a *livre* (Wood 2002, 77).

An example of 'ghost money' used as a measure of value in early medieval Europe would be the system of wergild payments (blood money) widely used. In Slavic regions the wergild was known as Główczyzna. Both traditions involve a fine paid by a killer or his family to the family of his victim, the size of the fine usually being calculated as a result of the social rank of the victim. A further example are of the laws of the Ripuarian Franks (from the Rhineland region), which were recorded in the late 8th or early 9th century and which evaluated crimes in golden *solidi* (pounds) – although they also provided a list of goods of equivalent value (Wood 2002, 78).

Real money

Until the middle of the 10th century little coinage changed hands during the course of daily life. There were several reasons for this, such as a general lack of bullion, an overall lack of expertise in handling coinage and the uneven distribution of those coins that were in circulation. What coinage there was in any given area would almost certainly have become concentrated in the hands of the lords. The local peasant economy would have functioned on a mixture of self-sufficiency, barter and only very occasionally payments using money (Wood 2002, 78). However, this rather simplistic view ignores the possibility of local systems of payments being made or transactions being undertaken using non-coinage money. Examples of this include the use of iron currency bars and axes such as the Scandinavian *vaerjern* (Leciejewicz 1979a, 48) and the Slavonic *grzywny* (Hensel 1987, 639-42); the Slavonic use of furs as money that is recorded by Ibn Rusta, an Arabic geographer writing between the years AD 903-913 (Lewicki 1954, 117-19); and the use of handkerchiefs as currency in Prague that is recorded by the 10th century Jewish traveller Ibrahim ibn Jacob and has been illustrated by archaeological excavations such as that of the 9th century cemetery from Great Moravia, Uherskè Hradiště-Sady (Dzieduszycki 1995, 101). The phenomena of non-coinage money is explored more fully in following chapters.

Although gradual, the expansion of a true monetary economy in northern Europe began in the 10th century AD and reached a climax in the first half of the 11th century. It was cased partly by the great commercial development of the Ottonian Empire and by an influx of silver from the Islamic world – combined with the discovery in the AD 960's of veins of silver in Germany, especially near Goslar, in the Harz Mountains. Mines were usually worked for about a century before becoming exhausted and in time the Goslar mine were succeeded by those at Freiberg, at Freisach in the Austrian Alps, at Jihlava in Bohemia and finally – the most productive of all – at Kutnà Hora I Bohemia in AD 1298. In

Southern Europe silver was minted at Montrieri in Tuscany and then at Iglesias in Sardinia. The 'long thirteenth century' (c. AD 1160 – c. AD 1330) was characterized by a 'silver rush' (Wood 2002, 79).

In early medieval European society the coin was an important cultural element with hugely symbolic character. It combined statements of prestige and authority on both a general level (the king's head) and a more elitist level (with statements, symbols and meanings that could be fully understood only by a certain social group, connected with the State and Church elite). Hence, at the basis of its symbolism were values bound up with authority and sacrum. The meagre issues of the first early medieval European coins point to their use as prestige items rather than a widespread and general economic use. For example, the early Danish coinage of the 11th century AD can be shown to have had a social and political function rather than an economic function. There is a geographical imbalance to this coin production: the number of mints seems to have been greater in western Denmark, although a greater volume of minting took place in the east, the core area of the Danish Kingdom. This bias in coin production has been related to differences in the structure of royal control. The eastern system was focused on the wealthy and stable crown demesne, while the western system was focused on supporting the royal patrimony or right to rule. The coinage and its many western mints can be related to administration and to the establishment of royal supremacy in remote but important parts of the kingdom (Gaimster 1991, 121).

Thus, while it was the authority of the state or ruler that guaranteed the quality and value of the coins that they issued (protecting them against abuses such as forgery), the coins themselves publicly and regularly demonstrated the power and authority of the state or ruler. State-regulated coinage also enabled a state or ruler to accrue revenue by imposing an overvalued coin in respect to the silver it contained. To work effectively, the basic system would have needed to fulfil two conditions. It would have to be regulated by a legal authority in order to

enforce the overvaluation of silver when paid in the form of acceptable coin. The coinage system (and the region which it served) would also have to have strong commercial attractions for traders; otherwise they would be put off by the loss involved in accepting overvalued silver coins – particularly once smaller denominations (and purely symbolic larger ones) were introduced in bronze.

Controlling of the coinage was a royal prerogative. In the mid 13th century Gerald of Abbeville (d. AD 1272), chancellor of University of Paris and opponent of Aquinas, started the royal position succinctly: "*To strike money and to protect it are the prerogatives of the king*" (translation after Wood 2002, 100). It was as important as the control of weights and measures if not more so. There could never be any question of tolerating local variations in the weight or quality of the coinage. There was therefore no question of devolving enforcement of standards to local level. As the control of metrological standards decentralized, control of the coinage become more centralized (Wood 2002, 100). However, a strong authority was first required to develop a stable system of coinage issue and control. Without this authority, silver coins (of authorities either removed by time or place) were treated merely as bullion – a situation that we will see in the long distance trade occurring in the early medieval period in the Baltic region. However, coinage was not a prerequisite for well-developed systems of unit standardisation in trade, tribute or taxation, occurring over distances both large and small. I will argue in the following chapters that the lack of developed centralised authorities in the early medieval period in the Baltic region encouraged merchants (as part of the systemisation of trade) to develop and use systems of standardisation accepted over a large area – systems that were used in parallel by individual authorities (such as within taxes and tributes collected by local princes or kings, religious centres, or external states or powers – including, for example, the tributes demanded periodically of the Obodrites by monastic sites in the Marches of the Eastern Frankish Kingdom).

Hoards and hoarding

The accumulation of wealth in the form of coinage is best represented archaeologically by the discovery of hoards. Indeed, one of the most characteristic features of Viking Age trade and exchange – or at least of wealth accumulation – are the many silver hoards. A very large proportion of such hoards from Scandinavia and the Baltic contain vast amounts of coins, although hacksilver and jewellery (particularly rings) are also represented. The chronology and interpretation of these hoards is discussed elsewhere in this thesis; however, the theories concerning the deposition of these hoards are of relevance here.

Such hoards may have been hidden in times of war, or deposited in order to secure their availability in the next life. They may also have been hidden away for safekeeping. The deposition of hoards has been used to indicate central areas of economic, as well as political, superiority, with their accumulation indicators of both plunder and trade. However, the hoards are often complex in character, containing elements of *primitive money* (such as hack silver and silver bars and ingots and iron bars, all valued by weight), *early coinage* (for example the early Danish coinage in Scandinavia), *primitive valuables* (such as the Scandinavian arm and neck rings, with their obvious social importance, which is discussed later) and *foreign coins* (basically used as hacksilver). This raises further questions as to their accumulation and functions, as well as questions about their deposition (Thurborg 1988, 303-304).

Scandinavian precious metal hoards reflect different functions: practical, social, political, or religious, but also different levels of exchange within society. Thurborg investigated the silver hoards from Öland (with the exception of Gotland the richest area of Scandinavian Viking Age hoards) and illustrated that, based on qualitative differences within the material, there were several

different kinds of wealth, showing diverse systems of circulation or economic spheres (Thurborg 1988, 302-25).

The ubiquitous Arabic coin could be used for the payment for goods, as personal and social valuables or turned into domestic jewellery, along with a general function as bullion in a casual, weight-based economic sphere. However, as Gaimster notes, "the lack of a uniform medium for exchange, as reflected in hack-silver where personal belongings were turned into means of payment, also shows a general economic structure in which transactions involving precious metal were not generally of a continuous character. The presence within this structure of a group of uniform and practical media, on the other hand, must be understood as a limited sphere where more continuous transactions did occur and indeed were characteristic. Such a sphere is likely to have operated at higher levels of regional organisation and would thus reflect inter-regional exchange. This is supported in the suggestive uniformity within the Scandinavian material of bars and ingots, even if local forms do occur" (Gaimster 1991, 119-20). This sphere would mainly have involved inter-regional contacts and exchange where, for example, distribution and control of raw material must have played an important role.

Thus, the characteristic variety of foreign and later domestic coins, bars and ingots, hack-silver and jewellery should be seen as representations of qualitatively different media, each of which functioned differently – and not simply as reflecting a uniform economy based on weight value (Gaimster 1991, 115).

The phenomenon of hoarding was traditionally explained mainly as a reaction to warfare and unrest: people buried their money and precious belongings, destined never to be recovered because of the owner's death. The alternative explanation for hoards is they are simply safety-deposit boxes. The more silver

presented in the economy, the more that gets buried and the more that is left behind to be discovered later (Samson 1991b, 128).

However, such an explanation would also imply that the deposited money was 'normally' employed in continuous circulation, an assumption that if unexplained and undefined, looks suspiciously like a modern market economy. Hoards may be seen as expressions of a primitive economy, in which the precious metal did not function within a system of continual exchange. Instead, gold and silver treasures were probably more personal belongings (their accumulation required by both the social gift-giving economy and that of trade and exchange), something that is supported by investigation of their depositional context. On the Baltic island of Gotland hoards are found buried not only within settlements but new hoards were constantly being buried throughout the settlement's occupation (Gaimster 1991, 113-14). Hoards may also have been deposited for religious reasons or to try to control the local economy by destroying wealth to reduce the amount circulating in society (Samson 1991b, 130-31). An argument for hoarding for religious reasons is highlighted by Gaimster (1991, 118), who notes that the ring in Scandinavia held properties above and beyond simple aesthetics and worth (being forever mentioned in the sagas as gifts both given and received, signs referring to hospitality, generosity and loyalty). Underlying this is the widespread belief in the magic power held in rings and precious metals. The gift contained some of the giver's personal essence and success. In the same way, a man's personal belongings and treasures held his own personal qualities and good fortune. Hence, the deeper meaning of hoarding and deposition of precious metal is not simply a matter of passive wealth but an act of preserving one's personal success into the after-life. The sagas, Gaimster notes, never mention such treasures being recovered again but rather the opposite: the disposal of belongings into the earth before one's death in order to preserve them.

In Scandinavia, the early hoards differ from later hoards in their greater percentage of hack-silver and jewellery. This might point to the types of exchange or plunder from which they were derived, to the nature of their depositional function or to their intention for future dispersal. Samson argues that the earlier hoards appear better designed as gifts to disperse to kin and friends (i.e. personal), while the later hoards look more appropriate to balanced exchange, purchase and sale, perhaps the purchase of followers in a bid for power (1991b, 132).

Gustin studied the chronological distribution of the proportions of minted and unminted silver recovered during the excavations at Birka (1998). She concluded that while general hacksilver was used in larger quantities (i.e. for purposes other than small-scale transactions) during the 8th and 9th centuries, during the 10th century the silver (particularly minted silver) became fragmented and may have been used for exchange and trade in local products. She noted that the use of weights seems to have declined during the later half of the 10th century – and ventures that coins and fragments of coins had become so common that they were accepted during small transactions without weighing (Gustin 1998, 81-82). If this pattern of economic use of silver is correct, it would seem to suggest that an early period of gift-giving stimulated later market trade. The assumption is that the more pieces a dirham coin is partitioned into, the livelier the local market in small transactions is (Malmer 1985, 190). However, one must remember that outside the 'pools of monetary economy' (where coins were commonly used as part of a weight-based monetary system) there was probably no common uniform circulation of coinage during the Viking Age (Malmer 1990, 158).

Markets and the growth of towns in the Baltic

The British Royal Commission on Market Rights and Tolls in 1891 defined a market place as 'an authorised public concourse of buyers and sellers of

commodities meeting at a place more or less strictly limited or defined, at an appointed time'. However, the term market can be used to describe both the physical market place and used to describe a type of exchange: market exchange rather than barter or gift-giving exchange. Market exchange can be based on the internally facing market place (where the market place is restricted to internal trade within the individual socio-political unit), the externally facing market place (where traders of different socio-political units can meet and conduct external trade) or the port-of-trade (an independent external market place where traders of different socio-political units can meet and conduct external trade).

There are several mechanisms within market exchange, basically resulting from whether or not the trader is the producer, a middleman or trader, or an emissary of the producer. *Central place market exchange* refers to exchange between primary producers. *Freelance* or *middleman trading* refers to the activities of independent merchants (and obviously does not necessarily require the presence of a physical market place). *Emissary trading* refers to the activities of an emissary of a particular socio-political unit (while a *colonial enclave* refers to the establishment of a market place by the emissary in the territory of another socio-political unit). *Port-of-trade* refers to the establishment of an independent market place founded by and for the sole use of external emissaries (Polanyi 1963, 31). It is unlikely that any of the market places of the Baltic were restricted in this way (freelance merchants will always have played a role, particularly in the early years of Viking expansion prior to the establishment of Scandinavian kingdoms), although several could probably be described as independent units in their own right.

The growth of coastal market places in the Baltic region would seem to indicate both freelance trading and perhaps several forms of emissary trading. Some market places will have developed independently (perhaps from an earlier beach market), while others (particularly to the east) may have been

deliberately founded by both freelance merchants and the emissaries of independent socio-political units. One should also remember that the nature of the network of trade and exchange in the early medieval period of the Baltic region not only included raw materials and goods, but technology (such as boat-building techniques and pottery manufacture) and ideas.

Trade and the growth of towns

In describing the interlinked trading systems in and around the Baltic and North Sea zone in the Viking Period (including long-distance and local trade), together with the social implications of these connections (such as elite prestige requirements; enhanced social organisation; and the patronage and organisation of craftsmen), may different aspects must be considered. The commodities of trade, the mechanisms of trade and the resulting social implications of trade are all important basic aspects to be considered. Regional differences in the growth of towns and market places and the use (or not) of coinage in a monetary system are also very important. The Carolingian empire and the North Sea zone employed a monetary system, while the Baltic zone employed a non-monetary, or barter system of exchange – the relationships between the two zones are another important consideration.

Trade and exchange are both initiators and indicators of economic and cultural development. The Baltic Sea saw an explosion of trade and exchange in the Viking Age, demonstrated by the many towns founded during this period. The mechanisms of trade and the commodities traded during this period are one of the main foci of this thesis. Archaeologists have long debated the definitions of trade and exchange. Many scholars believe that you cannot have a trade system without feudalism and that gift giving is an important part of the social organisation that is the chiefdom. Given that in the early Viking Age the social organisation of the West Slavonic region was that of chiefdoms, what role can be inferred from the many hoards of Arabic silver coins? The growth of

markets, towns and trade in and around the Baltic Sea region in the early medieval period does not conform to many of the expected patterns.

The growth of towns in north-west Europe, Scandinavia and around the Baltic rim has been the focus of several discussions and studies, most notably by Richard Hodges (1978; 1982; and 1996) and most recently by Helen Clarke and Bjorn Ambrosiani in their book *Towns in the Viking Age* (1991). The exact definition of what describes an early town has often been debated; Reynolds describes an early town as being "a permanent human settlement... in which a significant proportion of its population lives off trade, industry, administration and other non-agricultural occupations... It forms a social unit more or less distinct from the surrounding countryside" (1997). The causes and effects of these early towns have also attracted much archaeological debate and interest.

The idea of early medieval northern European *emporia* as economic gateway communities was introduced by Hodges (1982), who considered two main types: the temporary market place and the permanent settlement, the former a result of long-distance trade in prestige goods and the latter a result of an evolutionary attempt to maximise periodic long-distance trade and to introduce production (Hodges 1982, 51-52). He went on to consider such *emporia* as central authoritarian rational attempts to monopolise trade and "articulate the relations between the core Christian communities and those on the peripheries, and indeed, those non-Christian communities beyond" (Hodges 1996, 302). Although he had introduced the notion of authoritarian control into his argument (perhaps influenced by the archaeological evidence pertaining to the planned nature of many of the early towns), he retains the argument that economics – trade and production – essentially led to the foundation and growth of towns.

However, Saunders argues that "the notion of the tributary mode of production and social formation provides a radically different explanatory framework in which to analyse the development of [early medieval] trade and exchange... It

is within the context of the transition from antiquity to feudalism, rather than the origins of towns and trade, that we can begin to reassess the prestige goods exchange model and so, also, the *wic* [or emporium] model. The growth of prestige exchange and the subsequent establishment of *emporia* is not seen as the dynamic of social development, the foundation for the development of towns and the competitive market, but rather as a reflection of underlying social relations" (Saunders 2001, 11).

This view is based around the work of the historian Chris Wickham (1984), who studied the transition from antiquity to feudalism in terms of transformations in the social relations of exploitation. Using a Marxist viewpoint, Wickham developed the notion of a tributary mode of production and of social formation, focusing on the dynamics between centralised taxation and localised rent collection. He argued that the main movement towards feudalism began when tributary societies replaced (at least in part) centralised tax-collection with the rising power of the rent-collecting landlords. When rent replaced tax as the dominant form of surplus extraction the tributary mode was replaced by the feudal mode.

Gift-giving or the exchange of prestige goods is seen as the material manifestation of tributary social relations – of fundamental importance in early Anglo-Saxon social relations and institutions. *Emporia* are seen as true 'ports of trade', developing on the outskirts of an emerging kingdom, deliberately founded to regulate trade in luxury items for the exclusive privilege of the tributary ruling elite. Saunders argues that such *emporia* "were not markets for the distribution of agrarian surpluses, not nodal points in the rural economy, but centres articulating a separate commercial sector" (Saunders 2001, 12). He sees the shift away from wealth and status as defined by prestige goods and tributary reciprocity to being defined by landed wealth and hereditary tenure as signalling the declining importance of the emporium. He describes a distinct break in the archaeological record in the form and character of trading

settlements between the Middle and Late Saxon periods, suggesting that there was no smooth natural evolution of *wics* or *emporia* into towns. While the arguments and questions presented generally concern Anglo-Saxon England and the *wics*, they are equally valid when posed of the towns, trade and society of the early medieval Western Slavs.

However, as noted previously, growth of markets, towns and trade in and around the Baltic Sea region in the early medieval period does not conform with many of the expected patterns. Excavations at Staraja Ladoga, founded in the mid-8th century AD, suggested a mixed population from the start (Noonan 1997, 142). This is supported by the presence of different ethnic cemeteries. Craft workshops manufactured items in glass and amber – perhaps for exchange with native hunters and trappers for their best furs – and the fur trade provided the Arabic silver present in the archaeological record for the area (and beyond, into the Baltic) in vast amounts. Staraja Ladoga presumably initially traded with its wild hinterland from a position without territorial authority – a concept broadly unsupported by the substantivist view described below, which would have such trading centres as centres for politically controlled and administered trade.

Towns and the growth of trade

Tom Saunders notes that "the concept of the emporium has come to dominate archaeological interpretations of Middle Saxon England. The growth of prestige exchange at these primitive markets is often perceived as the propeller of socioeconomic development, the dynamic force underpinning the rise of kings and kingdoms" (Saunders 2001, 7). In a well-argued paper, *Early Medieval Emporia and the Tributary Social Function*, he analyses and deconstructs the generally accepted view proposed by Richard Hodges. This view is described as "trade and exchange and the growth of the market mechanism [being] perceived as the 'natural' forces for economic change" (Saunders 2001, 7). Proto-urban centres that were the vehicles of political and economic change,

promoting the rise of kings and kingdoms. This view is described by Saunders as an attempt to "examine the origins of the medieval town in terms of the break from a socially embedded economy to a socially disembedded economy" (Saunders 2001, 7). This view draws on concepts derived from the substantivist anthropological theories of the economic historian Karl Polanyi, which essentially played down the significance of market trade in order to focus on the socio-political side of exchange. The substantivist school defines 'economy' as the specific processes and organisations employed in the exchange of goods and services between human beings. Trade and exchange in earlier or primitive economies cannot be explained in conventional economic terms and concepts such as price theory or profit, but is something socially integrated and is to be regarded in qualitative terms. Polanyi saw exchange as an expression of relations between human beings and proposed a variety of different principles of distribution which expressed those relations: reciprocity, redistribution and market principle. 'Trade' could be expressed in terms such as gift trade, status trade, administered trade, or, less successfully, market trade (Gaimster 1991, 115). Lie (1991) took Polanyi's approach and extended it to fully embrace the market concept by arguing that markets can be treated as social networks or organisations constituted by traders. Hodges's evolutionary approach (1982) saw early systems of redistribution, reciprocity and gift exchange (economic structures *embedded* within social structures) gradually change alongside political and economic growth towards competitive market systems of urban production and exchange (a socially *disembedded* economy).

Urbańczyk noted (1994) that the belief in an 'essentially evolutionary' growth of towns on the outskirts of early medieval Europe was (and perhaps still is) a common position in current discussions. He argued that both the archaeological and historical records point towards discontinuity – a non-evolutionary process characterised by critical moments caused by conscious authoritative interventions. In a well-argued paper, *The Origins of Towns on the Outskirts of Medieval Europe*, he analysed the generally accepted evolutionary view that

early towns or 'town-nuclei' (proto-towns) developed in Central Europe as nuclei around strongholds, a result of locally growing economic potential, with trade being concentrated upon luxury goods consumed by local elites. However, Urbańczyk notes many interesting historical sources that would seem to disprove this simplistic theory, evidence of many instances of discontinuation in the development of individual towns, with many towns being recorded as deliberately founded, destroyed or relocated. He points to the stratigraphic data recorded during the excavations at Czersk (the former capital of Polish Mazovia), a sequence showing a complicated history of construction, reconstruction and destruction between the 9th and 15th centuries AD. He argues that what is clear from the evidence is that the involvement of authoritative figures (and the centralised organisation of the kingdom) is decisive during the history of early towns (Urbańczyk 1994, 114).

Hines argues that a true town is a site for specialised exchange founded on the authority of a politically or socially central power, with the collusion of traders and producers – but that some sites developed without such centralised authority and do justify the idea of a 'proto-urban sequence', although without the evolutionary element (Hines 1994, 23).

Both Saunders and Urbańczyk are arguing for a re-examination of the dominant concept of the evolutionary growth and assumed influence of the early medieval town; while Hines argues for a re-definition of the evolutionary sequence, precisely defining the proto-urban settlement and the true town. Can Saunder's assertion, that "the establishment of emporia was a temporary means by which to secure tributary alliances by regulating the exchange of movable wealth", be related to the situation in the territories of the Western Slavs? During the period between the late 8th and early 10th centuries, the social situations were probably broadly similar; however, the geopolitical situation was very different. By the 8th century the western European region had

developed elaborate forms of kingship, social hierarchies and economic systems.

The appearance of numerous defended settlements, in the form of wooden and earthern strongholds with accompanying nucleated villages, from the early 8th (but particularly in the 9th century) in the Slavonic areas of central Europe, is the most tangible archaeological proof of the development of social authority in Slavonic society. The rise of these so called 'chieftainship' social structures – materially proven by strongholds erected with great labour input, in much the same manner as the hillforts of Iron Age Britain – are not accompanied by the rich accoutrements usually visible in the material archaeological record of a social elite (Gąssowski 1997, 60). Further proof of a development of authority in society can be inferred from the hoards of Arabic silver coins, appearing from the 9th century AD – deposits that very likely provide evidence of a concentration of the riches of chieftains or a tribal oligarchy. Transformations in the organisation and structures of the pagan cult – particularly the development of cult centres and pagan shrines – also point to tribal centralisation of authority.

Johan Callmer states that "the development of urbanism in the Baltic region [from c. 700 to 1100 AD] was an intricate combination of local conditions with external influences, stimuli and models" (1994b, 78). He goes on to note the dangers of too much of a reliance on general models, feeling that this approach leads to an inability to perceive the uniqueness of individual foundations. He describes the development of towns in the Baltic region as "different sites with different functions: trading places of various kinds and political centres on different levels... The early urbanisation of Scandinavia and the Baltic region is a phenomenon related to developments in Western Europe but it must be viewed as a separate and unique process" (1994b, 80). Compare Ribe in the west or Grobin in the east to Wolin. Ribe in south-western Denmark was one of the key trading places for all of Scandinavia in the 8th century, with almost all of

the trade between Scandinavia and Western Europe passing through it. Ribe began as a seasonally occupied organised market, with activities connected to craft production and trade and exchange taking place on regular plots of ground. Whether the foundation of Ribe was the act of one powerful Jutish king, or was a more complex foundation involving several interests, it is impossible to ascertain (Callmer 1994b, 53). Ribe was an early Scandinavian foundation, topographically important in the west Danish heartland. Grobin was a small foundation on the eastern Baltic coast of mixed character of Gotlandic Scandinavians and Balts (Callmer 1994b, 57). It seems to have been the main centre of Scandinavian settlement in the Baltic countries (Clarke and Ambrosiani 1995, 115). Wolin, however, would appear to have been Western Slavonic in character – active within the Baltic trading networks and with evidence of Scandinavian merchants, but largely a Slavonic foundation. Callmer notes that the development of urbanism in the Slavonic regions of central Europe must have been somewhat similar, although with differences (such as the prominence of religious centres) that would seem to set it apart from the general Scandinavian or Viking trends that he highlighted.

Indeed, recent discussion has considered and included the expanding body of archaeological and numismatic evidence, largely collected by metal detection, which suggests that the early *emporia* in the North Sea zone were not the only places engaged in local and regional trade (Ulmschneider and Pestell 2003, 1-10). The evidence indicates a large number of smaller, less well-documented inland trading places (such as markets and fairs) and 'productive sites', few of which have been excavated. Those that have, such as Lake Tissø in Denmark (Jørgensen 2003, 183-207), are testament to the varying nature, complexity and functions of early medieval economic sites. The diffusion of coinage from *emporia* and mints – and their subsequent discovery in concentrations – can highlight the importance (and resources) of certain hinterland areas and trade routes. Such evidence may also survive in regard to the Baltic region. Of course, the implications to early medieval economic systems recovered by

metal detection may simply be implied – normal settlement patterns that have simply seen above average metal-detecting activity or favourable conditions of archaeological survival. It is clear, however, that much archaeological evidence remains to be recovered in regard to the wider local, regional and supra-regional complexities of early medieval trade and economy.

Gustin notes that the early Baltic towns "are sites where there were several different types of exchange: both politically motivated and controlled commodity exchange and trade for personal profit. The occurrence of standardised weights and scales together with high-quality silver in the Baltic Sea region suggests that some market trade took place" (2004, 268). Both gift giving and market trade – developing and consolidating into administered politically controlled exchange. However, this gradual development occurred alongside (rather than presupposing) independent external traders and local barter-based trade (such as the gathering of furs from a wide hinterland); trade perhaps stimulating and encouraging political development and political development perhaps protecting and encouraging trade. Trade is important in the context of the growth of towns; while towns should be considered key to the growth of trade.

This theme is explored in the next chapter, which describes the wider context of contemporary European trade networks and commerce – with a particular focus on the Baltic Sea and the region inhabited by the Western Slavs. The role and nature of the merchants will be explored, the merchants described as "a class set apart" by Clarke and Ambrosiani (1995, 175). There will also be a discussion of the main commodities in which they traded, setting the scene for the following chapter, a general description of the archaeological and historical evidence for standardisation within the traded commodities.

Context: the world of commerce

In order to better understand the economic situation around the Baltic Sea region we must first consider the wider contexts of Western Europe and the Middle East. This chapter explores the political and economic factors present in these wider regions and how these factors could have influenced the development of trade and exchange in the Baltic Sea region.

The development of a recognisable early medieval economy in northern Europe has its roots in the post-Roman mid first millennium AD and is reflected in the fate of the Roman system of coinage. The faltering fortunes of the gold *solidus* reflect the decline of Roman traditions of administration, while the later widespread growth of silver coinage reflects the development of early feudal 'barbarian' kingdoms (Grierson 1965, 502). Silver also proved crucial to the expansion of towns and trade – and the development of kingdoms – in the Baltic. To understand the development of trade in the Baltic region one must first investigate the surrounding (and preceding) systems.

Europe and the Middle East: the general historical background

The late Roman Empire was primarily an agricultural society, predominantly organised in huge aristocratic estates, the largest of which extended over several thousand square miles. The senatorial aristocracy who dominated this society drew their revenues from their estates in gold, either by the bulk sale of agricultural products or by the rents paid by their tenants. The key coin for such men was the high value pure-gold *solidus*, which had been introduced by Constantine in AD 309. The quantity of *solidi* received by senators, particularly by those in the western provinces of the empire, could be enormous, with senators of middling wealth boasting incomes of 1,000,000 gold *solidi* a year (Spufford 1988, 7). The state also used gold to maintain the army and the civil service, to keep up the public communications system and for the bulk purchase of food for free distribution to the favoured inhabitants of Rome and Constantinople (Spufford 1988, 8).

However, apart from gold there was very little else except for low-value copper coins, the denominations of which often fluctuated and changed. By the 5th century, the standard unit of copper was the *nummus*. Intermediate denominations between the *nummus* and the smallest gold coins, the *tremissis* (one third of a *solidus*), were sparse. Only by the AD 470s did a common intermediate denomination appear (struck by the urban mints), heavy copper multiple *nummi* coins. The largest of these, a 40-*nummus* piece, soon become known as a *follis*. By the middle of 6th century, single *nummi* ceased to be used and the smallest denomination minted was the *pentanummion*, the 5-*nummus* piece (Spufford 1988, 9).

Spufford writes that "the collapse of the Roman Empire in the west was so prolonged a process that to expect to find any cataclysmic change in the coinage would be unreasonable. No such violent change or lengthy cessation of coinage occurred except in Britain" (1988, 9). He notes that the use and minting of coinage was maintained throughout the area of the western empire (except Britain), with the 'barbarian' kingdoms of the Franks and Visigoths continuing to strike gold *solidi* in the names of the emperors. However, the copper coinage, while remaining in circulation for some time, was no longer generally minted, reflecting the social situation of the period. High value gold coins continued to be successfully used in revenue-gathering and taxation by the elites, but the urban society that had predominantly used the copper coinage had largely collapsed (Spufford 1988, 10). The towns of the late Roman Empire were centres of expenditure rather than production – as the landowners retreated to their estates, the agricultural economy of post Empire Western Europe became centred on self-sufficient villas.

Silver coinage was also produced by the 'barbarian' rulers in the west, albeit in very limited quantities. However, by the end of the 6th century, the issue of silver coins had virtually ceased and, for almost a century, no silver or copper coins were struck at all in the west. The use of gold was also not as widespread as it had been. This period, Spufford notes, marked "a distinct step away from the economic and political structure of the ancient world" (1988, 12). Gold had

been predominantly used as a mechanism by which to gather taxes and facilitate state expenditure. However, by the 7th century, the late Roman tax system that the 'barbarian' rulers in the west had inherited had broken down. There was no longer any state expenditure, with no standing army or civil service to pay and no need to supply the urban poor with bread and circuses. The gold was no longer in circulation and now formed massive royal treasure hoards.

By the end of the 7th century, there was a dearth of gold in the west. The royal hoards had been spent, but were unable to be replenished by taxation. Payment of warriors was now usually in land and mints had ceased to strike gold coins (except in Italy). However, in Frankia, the actual number of mints had greatly increased, reflecting the more localised nature of the economy and society. These mints struck silver *denier*. Local mints and silver coinage indicate a more rural economy, where regular markets and the exchange of rural produce required a 'middle value' coin (Spufford 1988, 25).

This situation fits well into the interpretation of the economic transformation of Western Europe between late antiquity and the early medieval period that was proposed by Henri Pirenne. Continuing long distance trade facilitated by urban markets was disrupted by Arabic conquest – shifting economic focus from south to north and stimulating the development of more localised, isolated, domestic economies. While the chronology of this hypothesis has not been challenged, more recent studies have tended to look more critically at the evidence (Lebecq 1997; McCormick 2001). Archaeological evidence indicates that, while high status Mediterranean goods did indeed continue to be available in the west, the majority (particularly in the north western periphery) were of extremely limited supply. Archaeological, historical and numismatic evidence points towards the continued use of the gold *solidus* of antiquity – but that barter and exchange formed the mechanism of the great majority of the distribution of goods.

However, local or regional trade did exist. Great estates still formed the local network within which goods and services were distributed; and more

widespread regional trading networks were being established in the west. Central to this development was the revival of towns as centres of administration and trade (Verhulst 2000, 111).

The Islamic World

Before we return to the west it may prove useful to describe events in the east. The Islamic world emerged in 7th century Arabia in a region dominated by ancient civilisations and cultures – not least the two powerful neighbours of Byzantium and the Persian Sasanian Empire. The foundations of the Muslim community were laid by Muhammad (c. AD 570 – 632) and his Umayyad successors – and by AD 750 the Islamic world had seen rapid expansion to include territory from the Iberian peninsula in the west to Transoxiana and the Indus river in the east. While the Umayyads continued to rule in Iberia and north-western Africa (until the mid 11th century), it was the Abbasid dynasty that ruled the majority of the Islamic world from Baghdad until AD 1258. However, even at its maximum territorial extent, the Abbasid Empire failed to control the whole Islamic world. The power of the Abbasid caliphate was centralised, existing mainly in the cities and productive areas around them. The authority of the caliph in the peripheries of the caliphate was maintained by governors, who, as time went on, developed powerful dynasties of their own. One such dynasty was the Samanids of Khurasan (Inner Asia) (AD 819 – 1005), who controlled the rich silver mines of Transoxiana (Hourani 1991, 38). In addition, the Umayyad dynasty held Iberia and the Fatimids held Egypt. Sects within the religious faith – the Sunnis, Shiites and Khariji – also led to political conflict and division. By the end of the 10th century the Abbasid caliphs were mainly titular monarchs, virtual captives of the warrior Shiite Buyid clan and, from AD 1055, the Seljuk Turks (Ruthven and Nanji 2004, 43).

During the 7th century AD, the Arab conquerors of the near east and western Mediterranean generally took over the coinage systems already in place within the areas that they controlled. In former Byzantine provinces the 'denarius aureus' (the gold *solidi*) and the copper *follies* continued to be minted as the gold *dinar* and copper *fels*. The Sassanian silver *direm* became the silver

dirham. It was only at the very end of the 7th century that the Caliph 'Abd al-Malik (AD 685 – 705) began the creation of an integrated monetary system for all the provinces of the caliphate, adjusting the previous coinage weights to fit with the Arabic weight system and changing the iconographic nature of the inherited coins to a purely epigraphic one.

Not only had the Arab instigators of Islam long held a mercantile ethos, but factors such as increased security within the Caliphate, the deliberate removal of all barriers to trade, larger social elites and rapid urban growth all led to increased trade within and between regions. The centre of economic activity moved east to the Iranian (formerly Sassanid) heartland and its northern outliers (such as Transoxiana). This growth in economic activity affected neighbouring regions. A vast commercial hinterland developed around the economic powerhouse that was the Caliphate: to the east along the Silk Road; to the south, embracing the whole Indian Ocean; and to the north and northwest reaching out over the steppes of eastern Europe and Russia (Howard-Johnston 1998, 72). Thus, the Abbasid Empire facilitated the emergence of a vast area of free trade without barriers and borders (Fig. 1) – and merchants and commercial activity were held in high regard within the Islamic world. This trade soon expanded beyond the borders of the empire into a vast commercial hinterland, encouraged by the demand for luxury goods created by the new elite of the Caliphal courts. The luxury market was encouraged by the need for conspicuous consumption by the princes and aristocracy – and the merchant class were happy to oblige. One such conspicuous element of the Caliphal court was the distribution of ceremonial robes (*khila*) to officers, officials, princes and ambassadors. The vast textile and tailoring needs were supplied by the official workshops of the *tiraz*. The ceremonial robes supplied by the *tiraz* were of the same importance as coinage in displaying the power of the Caliph (Bresc and Guichard 1997b, 268).

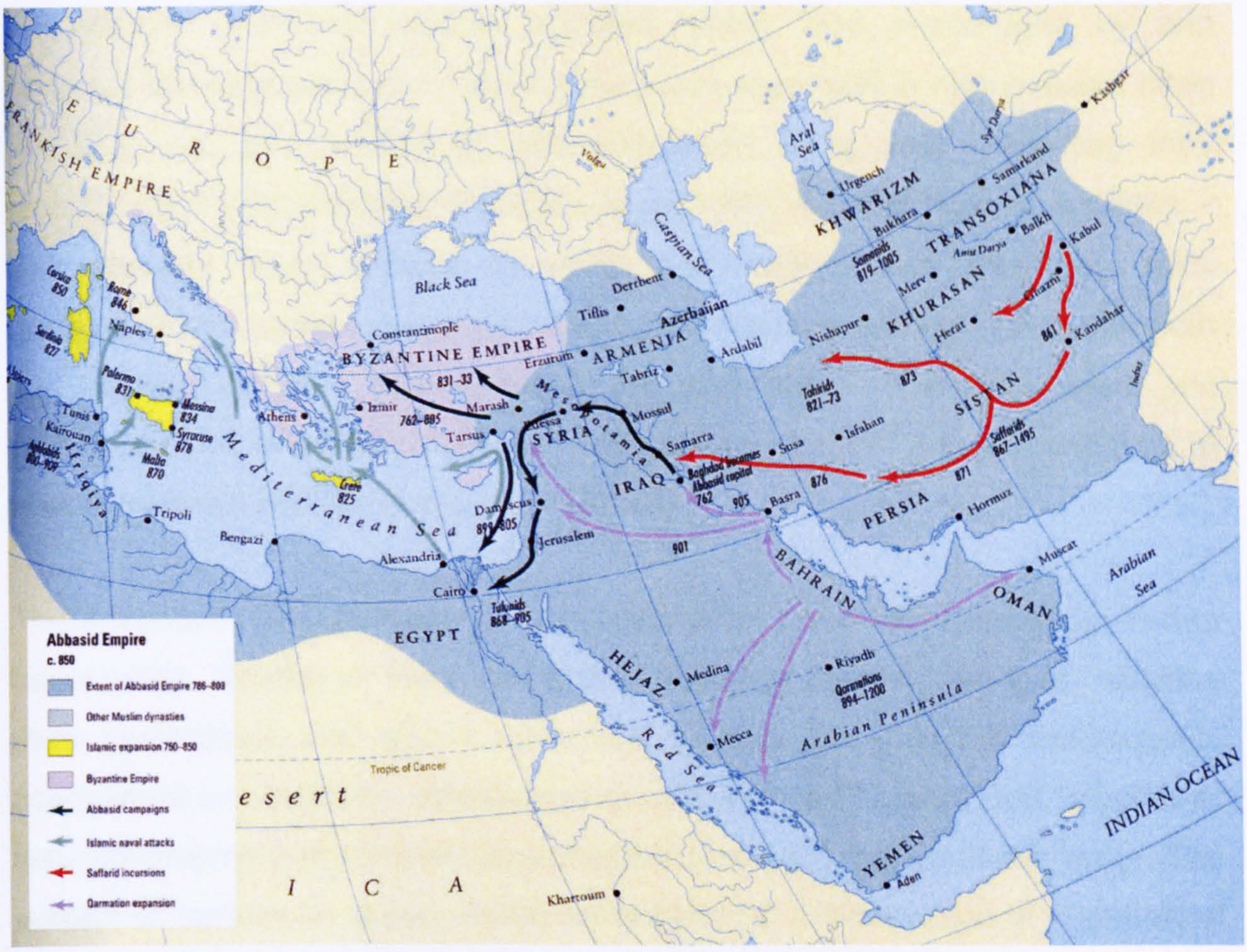

Fig. 1. The Abbasid Empire c. AD 850 (after Ruthven and Nanji 2004, 37).

Goods arrived by sea and by land, from India and China in the east; from Africa via ports on the gold coast and overland across the Sahara; and from the steppes of north-eastern Europe, via the river networks connecting the interior to the Volga Basin and the Caspian Sea (Howard-Johnston 1998, 72). The most important element of this new economic climate was the foundation of new towns throughout the Empire, full of soldiers, administrators, craftsmen and tradesmen. It has been noted that the most characteristic phenomenon of the demographic development of the core of the Islamic zone in the Abbasid period was undoubtedly the growth of towns (Nazmi 1998, 56), a phenomenon that had its roots in the conquering Umayyad period, in the armed planned camps that were based at the end of caravan routes and beside the great rivers (Bresc and Guichard 1997a, 214-16). In addition to the 'camps of conquest', Carver has noted of Islam and the existing towns of late antiquity that "where towns survived, Islam developed the existing network; where the urban network was already defunct, they resuscitated it" (1996, 184).

The Islamic economic system operated within, was encouraged by and reflected the religious laws of Islam. Merchants were held in high esteem, often marrying into the families of *ulama* (learned men) and supporting their educational establishments. Mosques were often situated next to markets – and markets were allowed to open both before and after the main congregational prayers. Long pilgrimages to Mecca would facilitate trade both by creating demand and enabling communication. Even the laws and philosophies of Islam allowed and encouraged trade and the accumulation of wealth (Nomani and Rahnema 1994, 22-23).

The obligations and prohibitions of Islamic *Shari'a* law are categorised in four major parts: *'Ibadah* or laws concerning religious practice, worship, religious rites, ceremonies and duties; *Mu'amelat* or laws pertaining to transactions, commercial or otherwise; *Munakehat* or civil and family laws; and '*Uqubat* or laws concerning punishments for transgressors of the Islamic moral order. The subject of *mu'amelat* covers divine injunctions on a wide range of commercial and economic topics, informing as to the acceptable types of ownership, purchase, sale, employment, wage contract, loan, rent, profit, agricultural, commercial and manufacturing partnerships, trade and even consumption. The Muslim is instructed (just as the Christian was) not to pay or receive interest on money borrowed or lent (Nomani and Rahnema 1994, 25). The Koran uses many commercial terms and ideas as metaphors – and trade was generally encouraged within its teachings. For instance, the Koran specifically warns against any sort of fraud in weights and measurements. Islamic *mu'amelat* laws were generally in the interest of commerce and merchants, facilitating trading activities not only among Muslim and non-Muslim subjects, but also including (and accepting) foreign merchants (Nazmi 1998, 48).

However, while the Koran stipulated general guidelines, the various schools of Islamic law established clear legislation and formulated jurisprudence. One major school of Islamic law was the Hanafite School, founded by Abu Hanifah (AD 699 – 767). The Hanafite School paid special attention to trade, particularly in regard to the abolition of custom duties and taxes on trade – probably because Abu Hanifah himself was a merchant. It spread throughout the

Abbasid Caliphate and had a much wider sphere of influence than any other known school of the time; indeed, all the Abbasid caliphs after Harun al-Rashid (r. AD 786 – 809) were adherents to this school and many Islamic scholars and authors considered custom duties on trade abhorrent (Nazmi 1998, 52). As a result – and in direct contradiction to established practices in the Christian world at the time – the imposition of customs duties and taxes was restricted in the Muslim world, further encouraging commercial activities. Compare this entrepreneurial spirit of free trade with the multiple taxes and duties present in early medieval Europe. The attitudes of Christian monarchs to free trade are well-illustrated in this extract from a letter of AD 796 from Charlemagne to Offa, King of Anglo-Saxon Mercia:

"*Concerning pilgrims, who for the love of God and the salvation of their souls desire to reach the thresholds of the blessed apostles, as we granted formally, they may go in peace free from all molestation, bearing with them the necessities for their journey. But we have discovered that certain persons fraudulently mingle with them for the sake of commerce, seeking gain, not serving religion. If such are found among them, they are to pay the established toll at the proper places; the others may go in peace, immune from toll. You have written to us about merchants and by our mandate we allow that they shall have protection and support in our kingdom, lawfully according to the ancient custom of trading. And if in any places they are afflicted by wrongful oppression, they may appeal to us or to our judges and we will then true justice to be done. Similarly our men, if they suffer any injustice in your dominion are to appeal to the judgement of your equity, lest any disturbance should arise anywhere between our men...*" (translation after Wilson 1985, 258-59).

One of the characteristics of the early medieval expansion of the Muslim world was its cosmopolitan nature. The Arabic administration allowed all the inhabitants of the conquered lands, both those who converted to Islam and those who retained their original faith, not only to preserve their former positions but also the opportunity to continue any commercial activities. Jews, Persians, Syrians and Egyptians were assimilated into the economic life of the

Caliphate, the officials of which worked to promote local and international trade (Nazmi 1999, 61-62).

The trade of goods such as fur and honey – and of slaves – from northern Europe for silver fits within this overall picture. The merchants at any stage of the long distance trade need not have been Muslim, but, the closer trade got to the Caliphate, the greater the need to play by their rules. It is easy to see how the machinations of Arabic trade (such as weights and measurements) travelled so far.

The Christian West

Compared to the economic and cultural unity of the Islamic world, Christian Europe was politically and economically divided between the Latin and Byzantine churches. Although the Roman west and the Orthodox Byzantine east often spoke of the need for unity, they were in fact rivals and while the borders of the Byzantine Empire were often pressed and harried, the many kingdoms of the west were riven with discord. Indeed, the economic attitudes of Byzantium were very different to those of the Abbasid Empire. Foreign merchants were confined to closely supervised trading posts – and Islamic merchants seem to have avoided them (Bresc and Guichard 1997b, 276).

The territories of the Byzantine Empire were often under serious pressure. In the 6th century the Slavs invaded from the north, later forming part of the powerful tributary empire of the Avars – pushing the Lombards into Italy who, in turn, evicted the Byzantines; and by the 7th century the Empire was being stretched to the limit, both by the Muslim advance in Anatolia and the Mediterranean and by Bulgar settlement in the north. These advances seriously affected the Byzantine Empire, greatly reducing its territory and therefore also its taxable base. However, the urban economy of Byzantium continued to thrive and the administrators regulated a large body of specialised craftsmen and manufacturers, with merchants often trading goods over long distances (Pounds 1974, 83).

Although Byzantine sea-power had weakened in the centuries after the rise of its Muslim neighbour, it still maintained a firm grip on the Aegean Sea and on much of the Black Sea coast. The *Life of St. Gregory the Decapolite* describes maritime life in the Aegean in the 9th century, its ports full of shipping and trade disturbed only occasionally by the threat of raid by Muslim pirates. The maritime trade of the Aegean and the Black Sea was intended essentially for Constantinople, just as that of the Mediterranean had been for Rome. The population of Constantinople required bread, with much of the grain arriving by ship from ports on the Black Sea coast (Pounds 1974, 342-43). Luxury goods arrived from all over the known world - and, just as the 'northern arc' from north-eastern Europe supplied the Islamic world with skins, furs, amber and slaves via the Volga basin and the Caspian, Constantinople was similarly supplied with north-eastern goods via Kiev and the Russian rivers that empty into the Black Sea. Although there were Rus attacks on Constantinople in AD 860, AD 907 and AD 944, trade treaties were signed in AD 907, AD 911 and AD 944 (Bresc and Guichard 1997b, 277).

However, much of Byzantium's trade was imbalanced – the artistic produce of their craftsmen was in demand in Western Europe, but it held little attraction neither in northern Europe nor in the Islamic world. The spices, raw silk, gemstones and ivory that arrived by sea or via the Silk Road from the east had to be largely paid for by the export of gold bullion. Gold was always in demand and much of the bullion that was shipped to Constantinople by western merchants ultimately left on its way further east (Pounds 1974, 343). However, in terms of coinage, the minting of gold *solidi* continued; and the 4th century standards and weights were maintained virtually unchanged until the 11th century. Despite a brief period in the mid 7th century when silver coins were minted (known as *hexagrams*), Byzantine coinage consisted of copper and gold (Spufford 1988, 22).

The Frankish Empire

The 8th century saw a great expansion of the power of the Franks, culminating in the conquests of Charlemagne (AD 742 – 814). An energetic and charismatic

leader, Charlemagne campaigned against the Saxons, the Lombards and the Avars – and unsuccessfully against the Emirate of Cordoba in Spain. The centre of power in the Carolingian empire lay in northern France and the Low Countries, specifically at Aachen. The presence of the emperor and his court brought trade to the region, as did the numerous rich monasteries. In this trade the Frisians played a leading role, both before and after their subjugation by Charlemagne in AD 785. By the early 8th century, Frisian trade was well established and Frisian silver *sceattas* (similar to the early *deniers*) were being minted in enormous quantities (Spufford 1988, 28). The coastal and riverine trade of Frisia (centred on Dorestad) successfully linked the North Sea region with inland Frankia. Trade with the Anglo-Saxon kingdoms of England, for example, comprised the exchange of slaves and wool for silver coin, wine, pottery and other goods. The silver seems to have come from Frankish mines. These small silver coins were ideal for use in high volume 'middle value' market exchanges and soon became popular and widespread throughout the west (Lebeqc 1997, 76). Frisian trade in the North Sea continued throughout the 8th and 9th centuries, only to be curtailed by the onset of Viking raids.

The local mints in Frankia continued to produce local coins (differing in terms of design and quality) until Charlemagne instigated a reform of coinage. Weights, measures and coin design all became centrally controlled. However, the Carolingian empire was still essentially a rural society; the Frisian ports were the exception rather than the rule. Spufford notes that "the use of money in the first half of the 9th century was thus far from uniform throughout the Carolingian empire; it could be very erratic and varied from time to time as well as from place to place" (1988, 48). The fragmentation of the Carolingian empire, assisted by the onset of Viking raids, saw both a gradual breakdown in the centralised control of minting and a considerable decline in the use of money in the late 9th and early 10th centuries. Indeed, the heavy burden of the repeated need to raise Danegeld (paid in coin and bullion) with which to bribe Viking armies has been argued as a direct cause of the decline in coinage use. The repeated sack of coastal trading ports and towns must also have had an extremely detrimental effect on internal trade and thus coinage circulation (Spufford 1988, 64).

McCormick writes that "Carolingian commerce ranks among the most controversial issues in medieval economic history" (2001, 2). There is little explicit historical record extant that documents Mediterranean commerce in the 8th and 9th centuries – absence which helped fuel the debate in the 20th century. However, the archaeological record of northern Europe has benefited from recent activity and our understanding of the economics of the great estates, markets and fairs – and of the growth of towns and trade of the northern European coasts – has been greatly enhanced (McCormick 2001, 6).

The commercial axis which linked north-western Europe with the Byzantine Empire ran southwards from the Low Countries to the Mediterranean and continued by sea from Italy to the ports of the Aegean and the Levant – but it was a very vulnerable route, exposed to piracy and risk. For example, raids and attacks by Muslim Saracen fleets from the eastern Iberian coast dominate the 9th century, with permanent bases left in Sicily and Southern Italy and attacks recorded all along the coasts of France and Italy (Rouche 1997a, 408). However, trade routes over the Alpine passes did link north-western Europe with Italy and the Mediterranean. It is now thought that north European trade with the Mediterranian declined in the 7th and 8th centuries, reaching a nadir around AD 700 (McCormick 2001, 576) – but that commercial life did not cease in north-western Europe, rather the focus of trade and commerce switched to the North Sea (within which the Frisians were particularly active) and then the Baltic Sea. However, the collapse of the unity of the Caroligian Empire in AD 840 – due in part to blunders by later kings and in part to incursions by Scandinavian Vikings (9th century), Muslim Saracens (9th century) and Hungarian Magyars (first half of 10th century) – led to the rise in territorial principalities and the economic importance of individual towns (Rouche 1997a, 402).

Between around AD 650 and 660 the enterprising Frisians began to mint a small denomination silver coin for use in merchant transactions: the *sceattas* (literally meaning treasure). By AD 730 – 740 the zone in which these coins are discovered matches the Frisian zone of commercial influence: England,

northern France, the Meuse and Rhine valleys, Frisia and Denmark. The new silver coinage replaced the gold coins of antiquity and led to an upsurge in economic activity in northern Europe. The low purchasing power and wide social distribution of silver coins enabled the proliferation of rural markets. They were also minted in enormous quantities (Rouche 1997b, 511-13). The Frankish Empire was touched by interlinked spheres of commerce that were growing or flourishing during the 8th and 9th centuries: the Abbasid Empire, Byzantium, the towns on the North Sea coast and the 'northern arc' with the activities of Rus merchants. Ibrahim ibn Yaqub, a Jewish traveller and merchant from Spain, travelled through the Frankish Empire in AD 965 and wrote that *"it is extraordinary that one can find at Mainz, at the extreme end of the West, perfumes and spices that only take their birth in the deepest end of the East"* (translation after Spufford 1988, 68). That commerce and trade occurred is also well-illustrated by this extract from the *Raffelstetten Plea*, documenting an inquest by the Carolingian King Louis the Child (r. AD 900 – 911) and dating to between AD 903 and 906. The document relates to tolls on the Danube and mentions salt, slaves, wax and horses as the principle merchandise; it also serves to illustrate an earlier point regarding the different attitudes to tolls and duties between the Islamic World and the Christian World:

"About tolls, it is our pleasure that old and fair tolls be exacted from merchants, both from bridges and boats as well as markets. But let the new and unjust ones not be exacted where either ropes are stretched out [to block boats], or boats go under bridges or in similar circumstances, in which no help is supplied to travellers" (translation after McCormick 2001, 640-41).

Fairs served as other meeting points for long distance trade. Regular local markets served the immediate requirements of the population, but the larger annual fairs were a different matter. The protection of the king, lord or church would be extended to all who wished to come, even from far afield. For example, what was probably a wine fair was held near the Parisian abbey of St Denis every October, after the grape harvest. Such fairs were evidently no longer simple outlets for surplus produce from the surrounding countryside. Returning to St Denis, deeds granting tax exemption mention that boats laden

with honey were arriving to sell their wares – and there are documentary references to Englishmen from the beginning of the 8th century and Frisians and *negociatores de Langobardia* after AD 750 (Duby 1974,101-102).

North-eastern Europe and the Baltic: regional detail

The foundations of a rich maritime culture were laid on the coasts and hinterlands of the North Sea and the Baltic Sea from as early as the late 7th century. Goods were manufactured and traded, transported by ship from port to port along rivers, coasts and over the open water. Towns such as Dorestad and Hamwic were early foundations (the earliest jetties at Dorestad were built in the late 7th century). Commerce flourished and the 8th and 9th centuries saw the trading networks and towns consolidate and grow. Silver was used as payment, weighed and measured using small folding scales and formed the basis of the weight-based economy. The 9th and 10th centuries saw the expansion of Scandinavian influence, initially as raiders and later as traders. The success and growth of the trading networks around the North Sea and Baltic led to the establishment of the powerful Hanseatic League, first documented (the *Hansa Alman(ie)* or German Hansa) in AD 1282 (Meier 2006, 117).

The North Sea and its early trading ports

The early merchants of the North Sea required designated sites, where they met and exchanged their wares. Perhaps originally little more than a beach market, these designated places could grow into fortified stockades – historical sources identify them as *portus* and later placenames include the Germanic *wik* and the Anglo-Saxon *burh*. Early medieval trade developed around these ports, trade in which the peoples of the North Sea – the Frisians, Franks, Anglo-Saxons and Scandinavians – all participated. From Frisian Dorestad in the Rhine delta ships could sail across the Channel to Anglo-Saxon Hamwic or London, or sail east to Ribe in western Denmark and follow the coast around to cross the Skagerrak and reach Kaupang in Norway.

Although conquered by the Franks in AD 734, after a series of campaigns, the Frisians of the Rhine delta played an important role in North Sea trade from the 7th to the 10th century – and there is evidence of their early influence within the Baltic. There is clear archaeological evidence of the importation of Frisian combs to Scandinavia during the 8th century; indeed, there is some suggestion that the Frisian comb influenced the design of later Scandinavian combs, indicating the status of this important cultural identifier (Callmer 1998, 474-79). Dorestad, strategically situated near the confluence of the Rhine and the Lek, was their capital. Excavations have uncovered evidence of a wide range of commercial and industrial activities, including textile manufacture, metalworking, bone-working and shipbuilding. Goods that were traded in Dorestad include slaves, timber, corn and wine; basalt quernstones, ceramics, glass and weaponry from craftsmen in the Rhineland; and metals, leather, fur and amber from Scandinavia. Dorestad was a true entrepot, a centre for trade between many different regions (Meier 2006, 58). Although it was attacked by Viking raiders on several occasions after AD 834, it remained prosperous until a shift in the course of the Rhine robbed the town of its geographical advantage.

Of the early Viking trading ports and towns, the foundation of Ribe is likely to be the earliest. The construction and development of Ribe cannot be separated from similar developments in the Frisian region (Callmer 1998, 471). A small seasonal market developed on the site – the wooden booths that have been excavated date to around AD 710. Craft activities include leather-working, bone-working, spinning and weaving. The settlement prospered and was fortified with a bank and ditch in the early 10th century. It became one of the first Scandinavian bishoprics in AD 948 (Meier 2006, 70-71).

Other early Viking towns include Kaupang on the southern coast on Norway (from where soapstone and slate for whetstones was traded and from where there is evidence of the importation of Slavonic pottery) and, moving into the Baltic Sea, the important trading ports of Hedeby and Birka (Clarke and Ambrosiani 1995, 65).

The Baltic and its early trading ports

It would seem that the Baltic Sea was far from the concerns of the Islamic world and the Mediterranean – except as a valuable source of slave labour. However, this situation would change, partly as a result of the far-flung raiding and commercial activities of the Viking Rus and partly as a result of the Latin and Byzantine churches seeking new converts, power and security. The Slavs of central and eastern Europe were courted by missionaries from the Orthodox south and from the Roman west, while Islamic traders and ambassadors explored for new commercial opportunities. Thus, before discussing the growth of trade and associated towns around the Baltic Sea, it may first be useful to explain the origins and development of the main ethnic group concerned: the Slavs.

The Slavs

As opposed to the patchwork of 'barbarian' ethnicities contained within the early medieval kingdoms of the west, the early Slavs were a remarkably homogenous group. Their expansion into eastern Europe in the 6th century is marked by the way that, despite being a widespread aggregate of local and regional groups (initially without any strong elites), the early Slavs retained common social traditions and a loose form of ethnic stability over a huge geographical area. Compared to the diverse post-Roman kingdoms of the west – and to the hierarchical societies of Byzantium and the Caliphate, with their strong central religious unity – the early Slavs certainly provide a different model.

The initial ethno-genesis of the Slavs probably took place to the east of the Carpathian Mountains. The Slavonic migration did not spread evenly throughout the areas into which they had arrived – and it is still impossible to state the exact territorial origins of the Slavonic groups. The ethnicity of the migrating Slavs can be described on two levels. While the language and successful agricultural economy of the Slavs secured a common Slavic identity, the individual identity of single Slavonic groups was determined mainly by local

experiences. The agricultural economy of the early Slavonic groups included the use of the advanced wheeled plough, the use of naked wheats and rye (a winter grain, allowing a more productive three field system), manuring and the rotation of crops. The dominant species of domesticated animals were cattle and pigs. The increase in agricultural productivity in central and eastern Europe during the second half of the first millennium AD is visible in the pollen record (Heather 1994, 54) and it could be suggested that economic power laid the foundations of the Slavic socio-political network (Dolukhanov 1996, 165).

The Slavonic tribes that arrived in Europe in the late 5th to early 6th centuries were not one single unified ethnic group, but shared a common language and many cultural similarities. These early individual migrating groups should not even be thought of as tribes, but rather as opportunistic agglomerations of families united behind a strong leader. Political competition between the elites of these groups established the regional dynamics of the period. However, these Slavonic groups did not settle in unpopulated areas of Europe – merely arrived in regions where the native populations were relatively politically undeveloped. Their successful arable economy attracted native peoples to adapt and merge with the incomers – thus, the native cultural assemblages observed within the archaeological record do not stop abruptly on the arrival of the Slavs, but gradually adapt or disappear (Dolukhanov 1996, 167).

We can distinguish two basic main groups in the initial Slavonic migration – a southern group (known as Prague-Korčak) and a northern group (known as Sukow-Dziedzice or Sukow-Szeligi). The southern branch (or group) travelled directly to territories on the Danube plain. The northern branch (mainly visible archaeologically in the record of the upper part of the Vistula River) crossed the Carpathians Mountains and entered the north European plain. The northern group spread to the west and to the east. By the end of the 9th century the material culture of the northern group was still relatively uniform, different cultural patterns between the Western Slav and Eastern Slav only developing with the expansion of Kievian power (Barford 2001, 96).

The leadership structure of the individual Slavonic groups within these main branches seems to have been relatively loosely organised, based on a strong leader and group consensus rather than the Germanic model of family dynasties or military hierarchies. Procopii Caesariensis, writing in the 6th century text *De bello Gothico III*, mentions Hildigis, a Longobard prince who was deposed from his throne and escaped to the east; within thirteen years he had raised an army composed of both Longobards and Slavs and had reclaimed his throne. The Slavonic groups were not unknown to follow leaders and elites of different ethnic origins – and this tolerance for such external political and social influence is a common thread that runs throughout early Slavonic history.

The relationship between the Avars and the Southern Slavs in the second half of the 6th century played an important role in the development of Slavonic political and military organisation. The mysterious Avars very quickly established superiority over the multi-ethnic population of a large area of central Europe – however, it is likely that their (much more numerous) Slavonic tributaries were as much willing partners as conquered subjects. Charlemagne destroyed the powerful tributary empire of the Avars in a series of late 8th century campaigns.

It was his language and culture that identified the Slav. From their origins through to the establishment of the early kingdoms, the homogenous aspects of language, settlement and material culture prevail. Unfortunately, the Slavonic material culture of the 6th century is not of particularly good quality: the pottery is of a low technological standard; there is very little jewellery or high-status goods; there are no indications of intensive long-distance trade; and there are few examples of combative weapons such as swords – only spear tips and arrow heads. The settlement record contains no large defensive fortifications, only small agricultural settlements. The archaeological record from the latter half of the first millennium AD in those regions populated by Slavonic groups would seem to indicate homogenous self-sufficient local communities practising a non-specific agricultural economy. As late as the 11th century this impression of a common homogeneity remains. Adam of Bremen, writing the historical and

geographical chronicle *Gesta Hammaburgensis Ecclesiae Pontificum* (Deeds of the Bishops of the Hamburg Church) was presumably referring to the Western Slavs when he noted in AD 1070 that "*Sclavinia is ten times bigger than our Saxony, especially if one treats as part of it Bohemia or the Polan beyond the Oder, since they do not differ, either in customs or language*" (translation after Barford 2001, 29).

However, we should not misunderstand the important aspects of this simple (and yet apparently attractive) pan-Slavonic culture. Ethnographic investigations have shown that the success of a society is closely linked to its ability to easily include alien peoples – treating them as equals (Urbańczyk 2000, 137). This could explain why Slavonic culture survives the geopolitical upheaval and confusion of the latter half of the first millennium AD. As Pohl remarks, "it became popular to be a Slav" (1988, 95).

The Western Slavs

The first truly Slavonic territorial organisations formed in the regions occupied previously by the Avarian-Slavonic culture. From AD 822 Frankish historical sources mention 'Moravians' in a political context. King Moymir I is described as driving out his great rival Pribina and founding the Moravian kingdom in AD 833 (Havlik 1989, 229). Using the examples of his neighbours to the west, Moymir created a stable political base for his dynasty – his power arose not merely militarily, but as a result of encouraging the spread of Christian ideology. The close links between the fledgling Slavonic kingdom of Moravia and their adoption of Christianity are mirrored in the histories of every other early Slavonic kingdom – for example the later Czech kingdom (whose Premyslid dynasty converted in AD 883) and the Polish kingdom (Mieszko I was baptised in AD 966) (Heather 1994, 48).

The beginnings of the formation and centralisation of local territorial organisations in the Slavonic regions can be attested archaeologically by the development of fortified settlements and market places – a successful pattern that was to continue into the medieval period with the development of

'stronghold-towns' (Możdzioch 1994, 129) and which particularly emphasises the role of authoritative power in the development of towns (Urbańczyk 1994, 114). The early growth concerned the neighbouring Carolingian Empire considerably and they prepared the so-called Bavarian Geographer (*Description Civitatum et Regionum ad Septentrionalem Plagam Danubii*) sometime around the middle of the 9th century AD. This described and listed the fortifications and settlements of the tribes of the Western Slavs. Many fortifications had been built in the region occupied by the Western Slavs in the 9th century, demonstrating the political ability of the chiefs and princes to both mobilise a workforce and seek to consolidate their territories. The emergence of silver hoards in the archaeological record of this period – and of trade and craft production sites – also indicates an economic background capable of sustaining the accumulation of capital. Excavations of settlement sites and burial grounds in Bohemia, Moravia and Wielkopolska have indicated largely continuous use (and a stratified society) from the 8th through to the 11th century. All are evidence of the rapid development and vitality of Western Slavonic society (Fossier 1997, 127).

The region that was to form the early territory of the Polish kingdom was dominated between the 7th and 9th centuries by some thirty small tribal groups. In the 9th century, these tribes were subsumed into eight greater tribes: the Polanie, Goplanie, Mazovians, Pomeranians, Slezanie, Opolanie, Vislanie and Lędzianie. From the middle of the 10th century, the Piast dynasty (originally the rulers of the Polanie) steadily extended their domination to create a united Polish kingdom. Thus, Poland enters history at the beginning of the 10th century, not as a fledgling kingdom, struggling to survive, but rather as a well-developed political entity. The leader who would later become Mieszko I began to consolidate his power over tribes in the Wielkopolska region. Positioned centrally in the area that would become his kingdom, Mieszko had an advantage that his neighbours did not: he was protected from the powerful Christian kingdoms to the south and west by those neighbouring tribes he would later subjugate. An account by Ibrahim ibn Yaqub, a Jewish traveller and merchant from Spain, describing his travels in the lands of the Western Slav in AD 965/6, describes Mieszko's Slavonic kingdom as one of the biggest and

most powerful he had seen. Ibrahim ibn Yaqub describes taxes, standing armies and towns – all from a state (his choice of word) that had yet to align itself with either the Latin or Greek churches. However, the pagan nature of the early kingdom of Poland made it vulnerable to a military crusade by its more powerful Christian neighbours. Mieszko married Dobrawa, a princess from the Czech kingdom to the south, in c. AD 965 and was baptised in AD 966 by the Czech bishop. This was a political decision, safeguarding his independence from the Germanic kingdoms and church to the west, while also affording him recognition from Christian Europe. The indigenous, pagan Slavonic religion was also likely to have been bound up with existing political structures, in the sense that each of the old tribal groupings was likely to have had its own cults or combination of cults, which both justified and sustained the existing order. Overall, therefore, Slavonic paganism probably represented a limitation on the new dynasty. Once a recognised Christian king, Mieszko was then free to turn his attention fully towards Pomerania, the wealthy pagan region to the north (Labuda 2002, 35-61).

Fig. 2. The tribes of the Polabian region in the 10th century AD (after Barford 2001, 390).

The tribes of the Pomeranian region occupied the Baltic coast between the Prussian Balts to east and the Polabian Slavs (the Obodrites and Veleti) to the west (Fig. 2). The archaeological evidence recovered from excavations at Wolin – one of the most intensively excavated early town site of the Western Slavs – illustrates the political and economic strength of the early Pomeranian region. The 9th century Bavarian Geographer describes two local Slavonic tribes, the Prissani and the Velunzani, noting that there were at least seventy settlements in the territory of each, illustrating the importance of the region and the power of its tribes. Archaeologically, this is demonstrated by the discovery of at least twenty hoards of silver coins in the region around Wolin; one of the most

concentrated distributions in both Pomerania and the Baltic. Wolin alone has produced thirteen hoards, with three more in its immediate vicinity, one of which (from Piaski-Dramino) has been dated to c. AD 950 and contained over 11 kg of coins and jewellery (Filipowiak 1981, 66).

Towns on the Southern Baltic coast

At the end of the 9th and the beginning of the 10th century, Wolin was a growing urban centre of craft workshops and trade, on a par with Birka and Hedeby in terms of importance within the early medieval Baltic trading network (Callmer 1994b, 66). The town was located where the river Dziwna narrows, near its confluence with the Oder. It was enclosed by a rampart and situated in a good defensive position on a hill surrounded by swamps. In the southern part of the town lay the market place and a port and quayside. The convenient location of Wolin, at the crossroads of several communication routes, led to an early and fairly intensive development of the settlement. Writing in AD 965, Ibrahim ibn Yaqub describes a large town with twelve gates and a port. Archaeological excavation within Wolin has demonstrated the importance of both trade and craft production to its 9th and 10th century inhabitants (Filipowiak 1981, 61-69). By the end of the 9th century the quayside at Wolin was between 250m and 300m in length, with regular jetties laid out at right angles to the quay, comparable with Scandinavian quaysides in the north and west. Dendrochronolgcal evidence indicates a date of construction around AD 880 – 90 (Barford 2001, 107). The pottery recovered by the excavations was almost entirely Slavonic in nature. The excavation of an area of craft workshops known as *Srebrne Wzgorze* recovered over 39,000 pieces and fragments of horn, the by-product of the production of combs, dice, needles and needle tidies. The scale of such craft production was clearly very large.

The political and economic importance of this region was such that from the 10th century onwards the neighbouring Polish and Danish kingdoms were actively covetous of the Pomeranian area. By AD 967 Mieszko I had established control over Wolin which enabled the fledgling feudal power of the Polish Piast princes to consolidate their grip on their territory by stimulating

internal trade. However, it was only by a series of bloody campaigns in the 11th century did the Piasts finally control the whole of Pomerania (Heather 1994, 62).

The political power of Wolin and Pomerania was not simply a result of successful trade. There is both historical and archaeological evidence of a pagan temple having been situated in Wolin between the 9th and 11th centuries. Even after the conversion of Mieszko I of Poland in AD 966 – and the subsequent seizure of Pomerania – there are continued historical references to the pagan temple at Wolin. This is both a measure of the continuing relative independence of the town from the fledgling feudal state of Poland – and an indicator of its origins as an ethnic and cultural melting pot. Wolin welcomed merchants from many diverse backgrounds – witness its mix of different house building styles – while retaining its Slavonic origins and nature. It was only after the intervention of the Polish prince Boleslaw III and the subsequent firm imposition of Christianity upon Wolin in AD 1124 that the relative political autonomy of the town was destroyed (Filipowiak 1981, 61-69).

The social and economic situation changed in the 10th and 11th centuries, resulting in the decline of long distance trade and the increase in the importance of local markets. Long-distance trade precipitated local trade, the trading settlement and attendant power base stimulated local production and exchange, while this in turn consolidated the political power of the early urban centre. Nearby Szczecin, with its large hinterland of agricultural production, came to the fore at the expense of Wolin. Subsequently, Szczecin became the main centre of local trade and production – and of political power (Kiersnowski 1954, 70).

The town of Kołobrzeg is mentioned in *Thietmar's Chronicle*, an early 11th century text recording the history of the Frankish court of Otto III. Kołobrzeg is recorded as *Salsa Cholbergiensis*, a translation of the Polish 'Solec kolo brzegu' or 'Salt near the shore' (Leciejewicz 1997, 133). Excavations have indicated that a settlement grew at Kołobrzeg, near the mouth of the River Parsęta, from the end of the 8th century or beginning of the 9th century and that

in the mid 9th century a stronghold was was constructed. The settlement is close to major coastal salt pans and it is clear from the excavations that its inhabitants engaged in fishing and that craft workshops also existed (there is evidence of iron working and amber and antler working) (Leciejewicz 1997, 134). The nearby stronghold at Bardy is associated with the barrow cemetery at Swielubie where a number of Scandinavian graves were discovered. Such graves, alongside the extensive finds of silver hoards from the 9th to 11th century bolster the evidence in the Pomeranian region from towns such as Wolin and Kołobrzeg of widespread long distance contacts and trade.

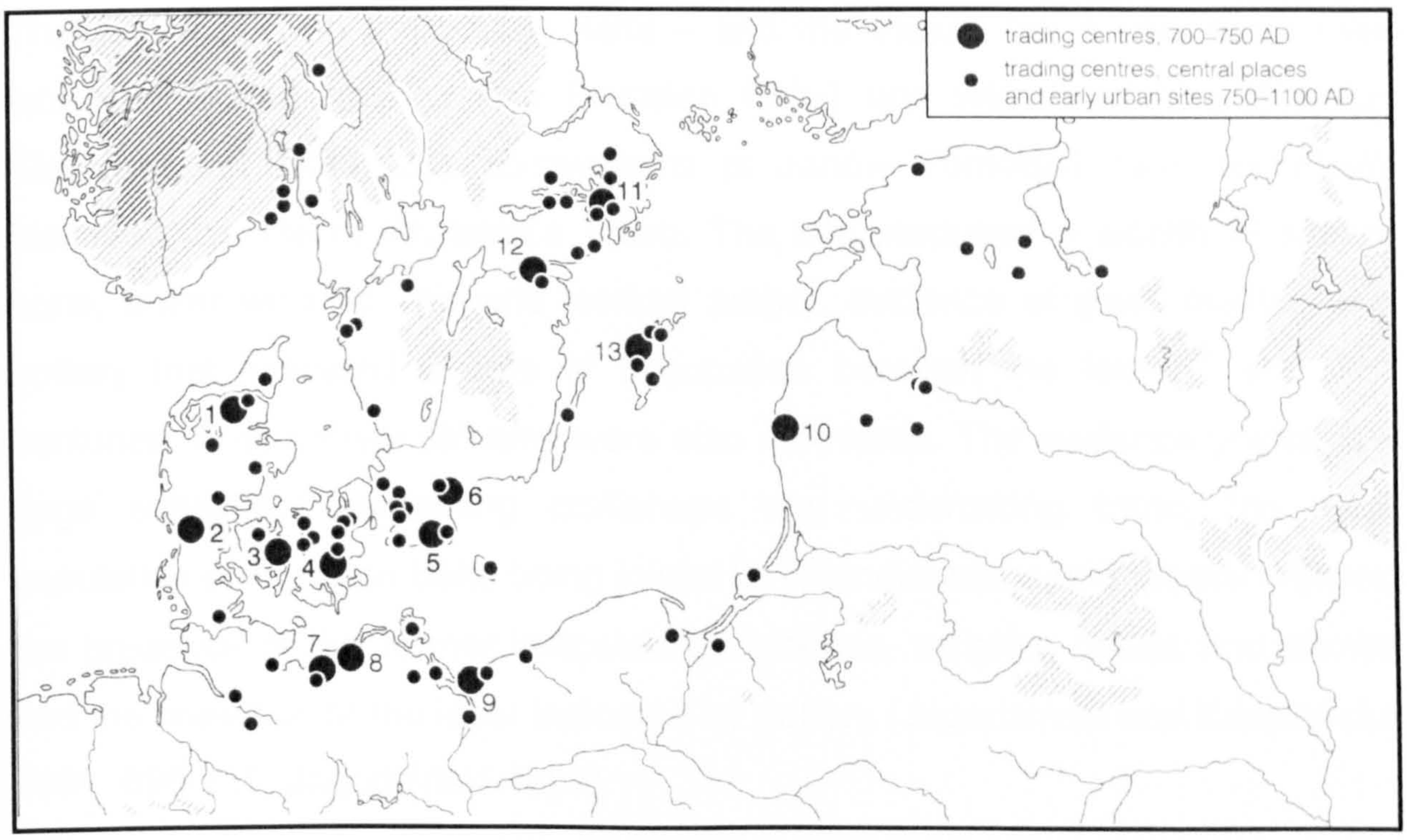

Fig. 3. Trading centres, central places and early urban settlements in the Baltic Sea area from the period AD 700 to AD 1100. [1] Sebbersund [2] Ribe [3] Lundeborg [4] Dybso Fjord [5] Ystad-Tankbåten [6] Åhus [7] Groß-Strömkendorf [8] Rostock-Dierkow [9] Wolin [10] Grobiņa [11] Helgö / Birka [12] Herrebro [13] Paviken (after Müller-Wille 2001, 22).

Other early trading towns and settlements on the southern Baltic coast (Fig. 3) include Starigard/Oldenburg, the seat of the Wagrians, a branch of the Obodrites (Müller-Wille 1991); Old Lübeck (Fehring 1990, 253) and Reric (Jöns and Mazurek 1998), trading towns of the Obodrites; Dierkow and Menzlin, trading settlements of the Veleti; Ralswiek on the island of Rugen, one of the main centres of production of the Slavonic Feldberg and Fresendorf pottery

(Clarke and Ambrosiani 1995, 109); Arkona, a settlement and cult site on the north coast of Rugen (Ellis 1978, 9); Elblag, probably the Truso mentioned by the Viking merchant Wulfstan; and Grobin, a Scandinavian settlement in the lands of the eastern Balts.

Wulfstan's account of his journeys in the Baltic survived in the contemporary appendices of a translation into Old English of the *Historiarum adversum Paganos Libri Septem* (Seven Books of History against the Pagans), a text written in the early years of the 5th century by the Spanish churchman Paulus Orosius (Lund 1984, 5). In an appendix to the main text, Wulfstan describes Truso as a port on the Vistula delta – and the Vistula "*as a very large river which separates Witland* [the Prussian Balts] *and Wendland* [the Western Slavs]" (Lund 1984, 23). Excavations at Janów Pomorski have tentatively identified the site of Wulfstan's Truso. The site produced a wealth of animal bone, antler working, raw and worked amber, evidence of glass making and pottery that indicated a date of occupation between the late 8th and 10th centuries. Arabic silver dirhams were also recovered. The evidence points to a large settlement containing craftshops and undertaking trade; the local population of Prussian Balts being joined by Scandinavians and Western Slavs, the presence of the former indicated by broches, weights, beads and combs and the presence of the latter indicated by pottery (Jagodziński and Kasprzycka 1991, 696-715; Jagodziński 1991).

Reric, a trading town of the Obodrites on the Western Slavonic coastline, is mentioned in the *Royal Frankish Annals*. Excavations at Groß-Strömkendorf are thought to have identified its site (Müller-Wille and Tummuscheit 2004, 27; Jöns and Mazurek 1998). Godfred, king of the Danes, destroyed Reric in AD 808 and transferred the merchants to Hedeby, an act that points to their importance and perhaps success. Limited areas of the (latterly planned) settlement and the whole of the cemetery of Groß-Strömkendorf were excavated in the mid 1990's, the results indicating a settlement of 8th century date, containing a mixed population engaged in a range of trade and manufacture (Müller-Wille and Tummuscheit 2004, 36). The finds assemblage from Groß-Strömkendorf includes a substantial pottery assemblage (largely of

Slavonic Sukow ware, but also including imported Frisian Tating ware), an enormous quantity of animal bone, evidence of antler and bone working (particularly in regard to the manufacture of combs) and a number of loomweights and spindle whorls (suggesting the manufacture of textiles) (Tummuscheit 2003, 212-13). The later phase of settlement seems to have followed a planned layout, suggesting the influence of a controlling authority – a development which coincides with the alliance of the Obodrites with the Franks and of the development of Obodrite strongholds in the region. Tummuscheit has suggested that the strengthening and consolidation of Obodrite political authourity prompted Godfred to act (2003, 219). The trading town of Reric may have had origins as an autonomous trading station (reflected in its first unplanned phase), but one to which the Danes felt they had a claim. However, regularity in plot divisions or indications of a planned layout need not necessarily mean political power. Callmer noted that it may simply have occurred as a result of "spontaneous self-regulation of relative equals and voluntary cooperation" (1994b, 77).

Towns of the Vikings

Although some sort of settlement existed at Hedeby before King Godfred resettled the merchants of Reric in AD 808, it was probably this act that led to Hedeby developing as an important trading centre and Scandinavia's largest town. Extensive archaeological excavations have revealed much. There was a mint – and what appears to have been a toll station – and evidence of widespread industrial activity, including metal, bone, amber and glass working, evidence of goldsmithing in the form of a number of dies (Armbruster 2004, 109-23), alongside pottery manufacture and ship repair. By the mid-10th century the town was protected by a large semi-circular earthern rampart – which still stands to this day. The harbour and jetties of the town were protected by a timber palisade. Hedeby was a major long-distance trading site, with evidence of industrial activities such as metal working, textile manufacture and bone and antler-working. It was positioned at the intersection of several important trade routes – none more so than the junction between east and west (Meier 2006,

79). However, archaeological excavation has revealed little in the way of evidence of trade with the North Sea region (Clarke and Ambrosiani 1995, 62).

The trading port of Birka on Lake Mälaren, Sweden developed in the mid-8th century and flourished until it was abandoned (as a result of land elevation and shore displacement in favour of nearby Sigtuna) from around AD 970 (Ambrosiani and Clarke 1998, 37). By the time it was abandoned, Birka was protected by a rampart, hilltop stronghold and a palisaded harbour. Excavations of the town and its extensive surrounding cemeteries have unearthed evidence of much trade and craft manufacture, including the preparation of furs (Wigh 1998, 86-89) and the manufacture of combs, both evidence of a Baltic trading network (Ambrosiani 1997, 183-85). Considerable quantities of Arabic coin suggest that the most important trade links were with the east, but Frisian woollen cloth (Geijer 1983, 84-85) and pottery and glass from the Rhineland have been found, evidence of trade with the west.

The central Baltic island of Gotland also hosted several early trading places – and many small harbours – some of which have seen excavation (Paviken for example). Several richly-furnished graves have been discovered and over 700 Viking Age hoards of hack-silver, Slavonic silver jewellery and Arabic dirhams recovered – a huge quantity for such a small geographical area. Many examples of weights and scales have been found on settlement sites. The island was certainly very prosperous, although whether as a result of trade or piracy is not clear (Clarke and Ambrosiani 1995, 82). The many small harbours of Gotland may indicate a wider Baltic Viking Age trend, as yet unsupported by the archaeological and historical evidence – that such small harbours and trading places were once common all around the Baltic coast (Carlson 1991, 158).

From the Swedish coast, Scandinavian expeditions took them up the Dvina, Volkhov and Neva rivers. From these slow-flowing and navigable waterways, portages led them through the forests to the head-waters of the Volga, Don, Dniepr and Dnestr and thus to the Caspian or Black Seas. They soon encountered Turkic Khazars, who were to act as middlemen in the trade

between the men from the north and the merscahnts of Islam (Noonan 1984, 277). By the first half of the 8th century AD, the Khazar dynasty had consolidated its power in the north Caucuses and in the forest steppe between the Volga and Dnepr rivers and was to rule for over 300 years (c. AD 650 – c. AD 965). Khazaria and the lands of the Volga Bulgars, established around the middle Volga by the early 10th century, were the gateways that made the great trade between the Islamic world and European Russia and the Baltic possible (Noonan 1997, 137). Geographical literature from the first half of the 10th century and later regards the town of Bulgar on the Volga as a major commercial centre where merchants from the north would meet with Arab merchants from the south. Ibn Fadlan and Ibn Rusta both mention commercial activities in Bulgar: Ibn Fadlan travelled to Bulgar in a great trade caravan described as consisting of three thousand people, many of them merchants; and Ibn Rusta, Arabic geographer writing between the years AD 903 and 913, describes how both the Rus and the Khazars travelled to Bulgar to trade with Arabic merchants, explaining that silver dirhams were carried for the purpose of commercial exchange (Nazmi 1998, 153). The Scandinavians played a great part in the trade with the Islamic world, with towns such as Staraja Ladoga key elements along the trade route. The earliest hoard of Islamic silver dirhams in all of European Russia was recovered from Staraja Ladoga, dating to around the mid AD 780's (Noonan 1997, 142).

The initial Scandinavian explorers and merchants that arrived in the Middle East were known as Varangians (some of which went onto become soldiers in the Varangian Guard, the elite bodyguard of the Byzantine emperors). Scandinavian settlement followed and the territory of the Rus was formed. New settlements such as Staraja Ladoga were founded in the mid-8th century; excavation has dated the earliest settlement at Staraja Ladoga to around AD 760 (Clarke and Ambrosiani 1995, 120). Finnish and Slavonic artefacts have been recovered from the earliest deposits, alongside Scandinavian objects such as a set of blacksmith's tools, suggesting a mixed population from the start (Łosiński 1980, 237). This is supported by the presence of different ethnic cemeteries – although a Scandinavian element was present from the settlement's initial foundation onwards (Pushknia 2004, 45). Craft workshops

manufactured items in glass and amber (perhaps for exchange with native hunters and trappers for their best furs), alongside tools, weapons and jewellery (Noonan 1997, 142).

During the 9th century, the Rus expanded their influence over the Slavonic settlements to the south. The hillfort of Ryurik Gorodishche (the precursor to the town of Novgorod) was an administrative, trading and craft-production centre for the surrounding network of Slavonic rural settlements (Nosov 1992; Nosov 1994); excavations suggest a Scandinavian influence at Ryurik Gorodishche (Pushkina 2004, 45), even before the growth of Novgorod as a trading centre in the second half of the 10th century (Rybina 1992, 193). Scandinavian influence is also visible at the existing Slavonic settlement of Kiev further to the south (Ioannisyan 1990, 287). Archaeological excavations at the settlements and extensive cemetery site of Gnezdovo, on the confluence of the Dniepr and Snitnets rivers, have uncovered further evidence of Scandinavian activity amongst the native eastern Slavs during the 10th century. The Gnezdovo complex comprises two settlement sites and eight cemeteries, containing over 3000 barrows (Pushkina 2004, 48). About 1200 burial mounds have been excavated, most proving to contain cremations. The few grave goods have comprised boat rivets, weapons and jewellery (often of Scadinavian type) – and about 7% of the burial mounds contained weights and scales (Pushkina 2004, 50). The pottery recoved is Slavonic, dating from the middle of the 10th century (Clarke and Ambrosiani 1995, 123). The population of Gnezdovo appears to have contained three groups: the Slavs, the Scandinavians and the Balts. There is evidence from the Gnezdovo cemetery of the presence of several burial rites and a certain degree of 'hybridisation' (Bulkin 1973, 11). The archaeological evidence from Staraja Ladoga and Gnezdovo suggests that the small settlements present at the end of the 9th century had developed into significant (and sizable) urban settlements by the end of the 10th century (Clarke and Ambrosiani 1995, 124).

By the 11th century the Scandinavian Vikings – warriors, craftsmen, merchants and families – had become fully assimilated with the native Slavs, a result of cultural proximity, intermarriage and alliances (Pounds 1974, 345). Interesting

historical illustrations of this process of assimilation are the trade treaties signed between the Rus and Byzantium: the Rus signatories to that of AD 911 all had Scandinavian names, while several signatories of the treaty of AD 944 had Slavonic names.

Relationships between the Slavs and the Franks

Although there is much historical evidence for conflict and raiding across the borders in both directions (Heather 1994, 60), there is a little documentary evidence concerning the movement of merchants from the Carolingian Empire into the Slavonic east. However, *The Capitulary of Diedenhofen* of AD 805 issued by Charlemagne regulated the passage and movement of merchants in the borderlands between the Carolingian Empire and the Slavonic lands to the east. The document does not describe or define the frontier, simply the controls proscribed upon merchants seeking to cross and establishing several designated and controlled trading emporia. It ensured that western merchants (and presumably the Slavonic merchants coming to meet them) were controlled – and could not supply arms nor armour to the Slavs:

"As for how far merchants heading for the Slavs and Avars may precede with their goods. Namely in Saxony as far as Bardovik where Hredi is in charge, and to Schezla [near Celle] *where Madagaudas is in charge, and to Magdeburg* [where] *Aito is in charge, and to Erfurt* [where] *Madagaudas is in charge; to Hallstadt* [unknown – near Bamburg?] [where] *Madagaudas is also in charge, to Forcheim and to Breemburg* [probably Pfreimt] *and to Regensberg where Audulf is in charge and to Lorch where Warnar is in charge. Let them not take arms or armour for sale. If any of them are found carring these, let all their property be taken from them, and let half of this go to the palace treasury, and let the second half be divided between the mentioned leaders and the finders"* (translation after Barford 2001,174).

The document also describes the various eastern marches controlled by the Franks. As the full integration of these marches was never achieved, one result of the contested 'buffer zone' was the independent development of ethnic and

regional stabilisation within the territories of the Western Slavs. In spite of numerous military defeats and political dependencies, tribes of the Western Slavs ensured a certain independence, enabling later consolidation in the kingdoms of Poland and Moravia (the first of the Slavonic lands to emerge as an organised principality but was destroyed by the Magyars in the beginning of the 10th century) (Brachmann 1997, 31).

The kingdom of Bohemia consolidated its position over the course of the 9th century, sandwiched as it was between two powerful neighbours: the Frankish Empire to the west and Moravia to the east. The Premyslid princes steered a course close to the Franks and, as a result, in the 10th century Bohemia was, alongside Bavaria and Saxony, one of the most highly developed regions of central Europe. The capital Prague was one of the biggest towns in Europe and a significant staging post in the trade of slaves. Merchants from throughout central and eastern Europe – and from the Frankish Empire – are mentioned in the historical sources (Huml 1990, 269). In about AD 965 the Jewish traveller Ibrahim ibn Yaqub describes the city of Prague as *"the richest in trade of all these lands. The Russians and the Slavs bring goods there from Cracow; Muslims, Jews and Turks from the lands of the Turks also bring goods and market weights* [coins]*; and they carry away slaves, tin and various kinds of fur"* (translation after Barford 2001, 255).

The main Slavonic allies of the Carolingians, at the turn of the 9th century, were the Polabian Obodrites, occupying the land between the lower Elbe and the Baltic Sea coast at the eastern base of the Jutland peninsula. The Royal Frankish Annals relate several accounts of the role they played in Charlemagne's reign, showing them being used in the wars against the Saxons (RFA 795), Danes and other Slavs hostile to the Franks (RFA 808, 809, 815) (Heather 1997, 176-77). It also seems likely that the Obodrites had been granted trading privileges, or had used their Frankish-backed pre-eminence to establish some kind of dominance over trade. Historical sources note the success of the merchants based at Obodrite Reric: the Danish king Godfred and the Polabian Veleti apparently formed an alliance in AD 808 to attack the Obodrites. The latter were known to have considerable wealth and the alliance

seems to have been based on shared greed. After the successful attack, Godfred relocated the Obodrite merchant community from Reric to Hedeby and the Veleti are said to have taken substantial amounts of booty (RFA 808) (Heather 1997, 178).

The fledgling Slavonic kingdoms of Poland and Moravia were successful perhaps partially as a result of their relative distance from the acquisitive Franks. The Obodrites were eventually subsumed into the Burgward March system, while the early Polish kingdom grew and stabilised. The Frankish rulers were able to place strict limits upon state formation within their immediate frontier region (and often tried to instigate and maintain political chaos among their immediate neighbours), but had less control beyond it (Heather 1994, 54; Heather 1997, 181).

Relationships between the Slavs and the Scandinavians

A historical reference to an alliance between the Slavs and the Scandinavians has already been mentioned: King Godfred's attack on Reric in AD 808. The Danish king and the Polabian Veleti formed an alliance in order to attack the Obodrites and loot the town (Heather 1997, 178). In addition, there are several historical references pertaining to political marriage alliances between Slavs and Scandinavians. At the end of the 10th century the wife of the Danish king Harald Bluetooth was the daughter of Mistivoi (Mściwoj), an Obodrite prince; at the same time Sygryda, the daughter of Mieszko I of Poland, was the wife of the Swedish king Eric the Victorious. After the death of Eric, Sygryda married Sven Forkbeard, the Danish king; she was the mother of both Kanut the Great and Olaf Skotkonug (who was also to take an Obodrite wife) (Strzelczyk 1999, 163-64). This political manoeuvring indicates the importance of the Slavs as regional political players.

The recent excavation of a Western Slavonic cemetery in Kałdusy, near Chełmno (in the Pomeranian region), dating from the end of the 10th century or the first part of the 11th century, recovered evidence of Scandinavian burials (Chudziak 2001; Chudziak 2002). Grave chamber 140 (Fig. 4) contained a

male and the equipment and style of the burial would indicate a Scandinavian. Chambergrave 71 contained a twin burial, very different from the other burials and located on the edge of the cemetery. One of the inhumations was again a 'Scandinavian' male – here accompanied by a female with Slavonic types of jewellery. The type of grave and the male equipment would certainly suggest a Scandinavian grave but the female may be Slavonic, perhaps indicating an 'international' marriage.

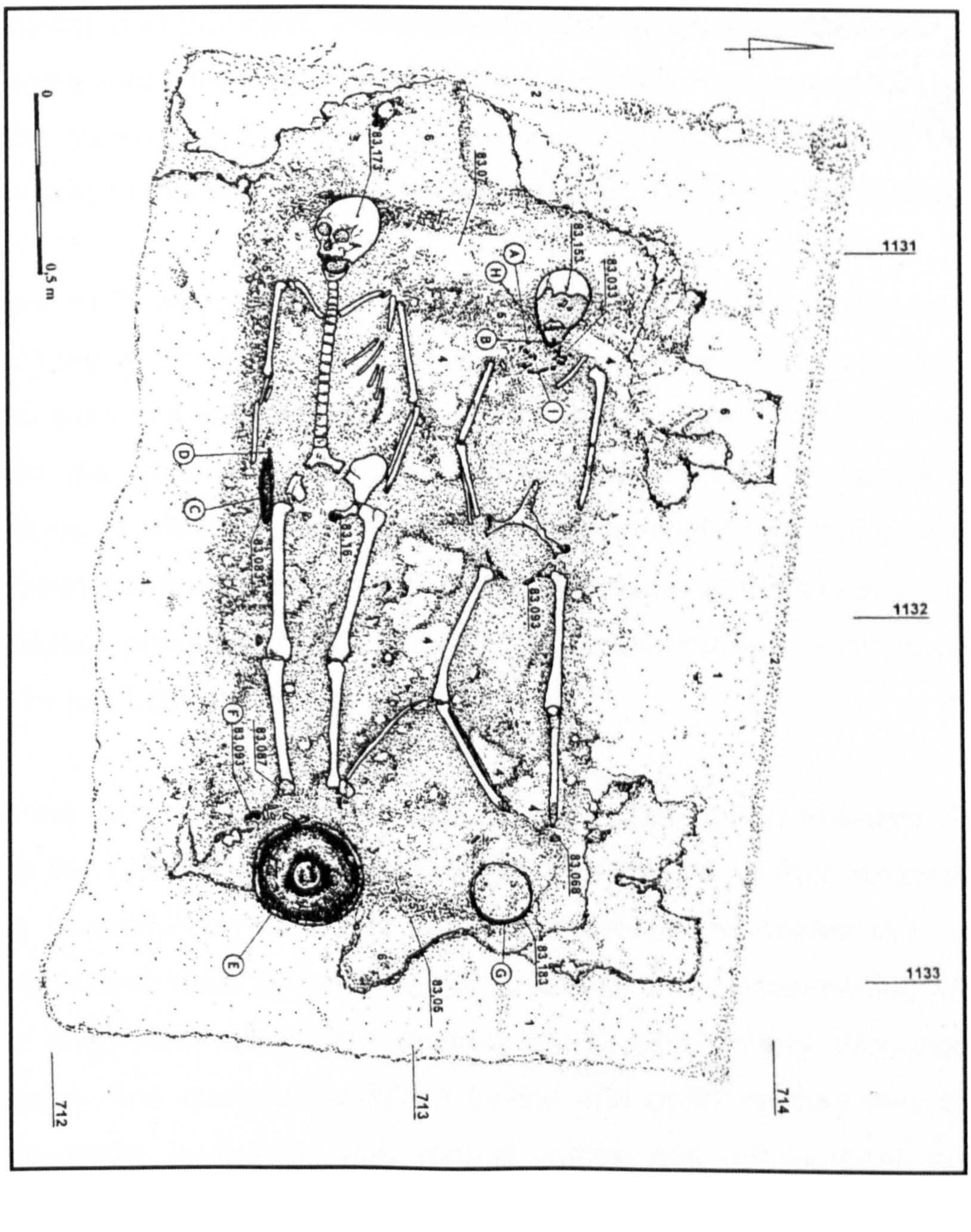

Fig. 4. Grave chamber 140 from Kałdusy in the Pomeranian region (after Chudziak 2002).

The archaeological record of the Western Slavonic region shows that there were no purely Viking settlements on the Baltic coast, the settlements that existed being predominantly Slavonic in nature. However, one of the earliest

indicators of the presence of Scandinavians in the area occupied by the Western Slavs is the cemetery of Świelubie outside the fortified settlement of Bardy (Łosiński 1965). The cemetery contains at least 106 burial mounds. The 36 excavated mounds contained four inhumations and at least 66 cremations, all from the 9th century, with associated grave goods that include many imported objects. Several of these burials are likely to have been Scandinavians; one of the female cremations included a set of very Scandinavian oval brooches. There are signs of Scandinavian influence in most of the settlement sites of the south Baltic rim, both in the occupation deposits and in the graves (e.g. Żak 1975; Żak 1985; and Żak 1988). However, there are very few graves that can be identified as containing Scandinavian inhumations.

At the end of 9th century, the settlement at Bardy failed. The nearby settlement of Kołobrzeg in Pomerania, which began as a result local salt production, began to grow and was subsequently enclosed by a wall. Historical references attest to the importance of this salt production and the archaeological excavations of the town and its saltpans have confirmed this (Leciejewicz 1960). Scandinavian artefacts recovered during excavations show a continuing Scandinavian presence in the region. The Scandinavians may have been trading for salt from Kołobrzeg.

One of the most extensively excavated urban sites in the Western Slavonic region is that of Wolin. The artefactual evidence recovered from excavations at Wolin is basically very similar to those assemblages recovered from Hedeby and Birka. Comb-making, amber-working, leather and textile-making and iron-working tools have all been identified, along with pottery production and shipbuilding. The quayside at Wolin by the end of 9th century was between 250m to 300m in length, with regular jetties laid out at right angles – comparable to others in the north and west (including Hedeby and Birka). However, it is plain from the excavations that Wolin was no mere mercantile imposition. The majority of the structures excavated are Slavonic in nature – and the pottery is almost entirely Slavonic in type.

It is also clear from both the archaeological record and historical sources that Wolin was open to merchants of many different descriptions. One of the excavated houses is very likely to have been built by a Scandinavian: its plan and construction is foreign to Wolin, while it contained fragments of furniture of Scandinavian design and, perhaps most tellingly, pieces of wood inscribed with runic inscriptions and fragments of soap stone vessels. Adam of Bremen (Labuda 1999, 215) later describes Wolin as being inhabited by many foreign merchants, although he notes that Saxons were instructed to practise their Christianity behind closed doors.

The excavation of an area of Wolin known as Srebne Wzgórze, consisting of craft workshops of the 9th – 11th centuries, recovered well over 39,300 pieces and fragments of horn, the by-product of the large-scale production of combs, dice, needles and needle-tidies (the quantity of fragments often quoted results from the excavation of only two workshops). The combs were very richly decorated and, other than local designs and forms, the assemblages recovered include Frisian influences (dating from the 9th – 10th centuries), Scandinavian influences (10th – 11th centuries) and later Polish and Russian influences. This would suggest that the craft workshops of Wolin were also producing combs for export. This is mirrored in the local production of amber pendants, such as Thor's Hammer (for the Scandinavian market), the half-crescent (perhaps for the Islamic market) and the three-headed horse (probably for the Slavonic market).

The main evidence of a Slavonic presence or influence within Scandinavia is pottery and jewellery of West Slavonic manufacture. The jewellery includes items of Slavonic manufacture (such as crescentic silver pendants) or influence (such as the necklaces of rock crystals mounted in silver foil that have been found in several Gotlandic hoards) (Noonan 1997, 143). Much of the Slavonic pottery is of a high standard and was either produced in Scandinavia by Slavonic craftsmen or slaves, or arrived as a traded commodity in its own right. While there are examples of Slavonic cooking vessels in the Scandinavian archaeological record, for example from Birka (e.g. Callmer 1988), Helgö (e.g. Holmqvist and Arrhenius 1964) or Borholm (e.g. Żak 1961), much of the pottery

may have been used as storage vessels in trade – perhaps containing honey. Interestingly, the present-day Swedish term for drink based on honey, mjöd – and indeed the English word, mead – has its roots in the Slavonic name for drinking honey, mód.

Writing towards the end of the 11th century, Adam of Bremen in the *Gesta Hammaburgensis ecclesiae pontificum* (History of the Archbishops of Hamburg-Bremen) describes further international co-operation at the semi-fortified market town of Birka, recording that the merchants included Slavs. The difficult artificial and natural seaward defences along the approach to Birka would have necessitated the prior welcome and trust of any foreign merchant.

There is also archaeological evidence of Slavonic settlements on the Southern Danish islands of Lolland and Falster (e.g. Łosiński 1997, 77; Leciejewicz 1993). Rather than intrusive settlement, the presence of these Slavonic settlements in Danish territory may have similarities with the historical events at Reric in AD 808, where the transfer of the merchants to Hedeby presumably included some of Slavonic origin. There is also archaeological evidence of Slavonic settlement in Mölleholmen in Skania, Sweden (Łosiński 1997, 77).

The common view, often proposed in both popular and academic archaeological texts, holds that the Scandinavian towns (and towns of the Baltic coasts) can be seen as centres in an extensive external exploitation, where the resources gathered by Viking exploits abroad were converted. Traders and artisans found it advantageous to meet and exchange their goods, production became centralised and the towns grew, many with evidence of a planned layout, organised, protected and controlled by the king. Institutionalised and protected by authority, trade was the catalyst for social development. As an example from popular literature, John Haywood writes in *The Penguin Historical Atlas of the Vikings* that "most trade was short-distance, conducted by farmer-merchants to and from dozens of small ports around the Scandinavian coasts. A smaller number of international trading places attracted merchants from England, Frisia, Germany and occasionally even as far afield as the Caliphate of Baghdad. Most of these centres began as seasonal meeting

places where craftsmen set up temporary workshops and merchants could trade by barter or for silver. Successful centres, like Hedeby and Ribe, developed into Scandinavia's first towns. Kings sought to encourage and control trade by protecting merchants from piracy in exchange for tolls and taxes. In this way, trade aided the growth of royal power in Scandinavia" (1995, 38). In other words, exchange and tribute can be seen to develop into trade and taxes. However, this view is centred on Scandinavia – the growth of towns and trade was neither contemporary throughout the Baltic nor can it have followed such fixed patterns.

Merchants and Travellers

In and around the Baltic Sea region there is evidence (in the form of towns, trading ports and goods) of long distance trade. The craftshops housed in many of these 8th and 9th century towns (Wolin, Birka and Hedeby for example) point to specialised crafts such as comb-making, amber-working, metal-working and textile manufacture; goods that could service the needs of communities at both a local and regional level. The populations of the early towns must have fluctuated; craftsmen can work all year round, but long distance trade is a seasonal activity and local markets usually follow the demands of the agricultural year. The towns (or proto-urban centres) must have been reliant to some extent on their rural hinterlands for subsistence: provisions and the supply of raw materials. In some cases (Hedeby for example) this is not the case, the town being established in a region which was very sparsely populated. Such towns were initially dependent upon provisions being shipped to it from further away (Callmer 1994b, 64). However, whether largely self-sufficient, dependent upon hinterland or dependent upon external suppliers, the towns involved in early medieval trade in and around the Baltic Sea were used by (or utilised) a wide variety of people, not simply the merchant or the lord and his retinue.

Who were the merchants and travellers of early medieval northern Europe? We can presume that the merchants and travellers of early medieval Europe were people who were able to cross political and cultural barriers, negotiating not

only the journey itself, but also organising the transportation of a bulky or valuable cargo (and also supplies necessary for the journey). They would have needed guides and translators, baggage handlers and guards. There are historical descriptions of and from Jewish merchants and travellers, Muslim merchants and travellers, Frankish and Frisian merchants, Scandinavian merchants and Slavonic merchants. Much work in translating the historical sources concerning the relationships between the Slavs and the Muslim merchants and travellers was done by the Polish historian Tadeusz Lewicki (1952; 1951; 1955; 1956b; 1961; 1965; 1969; 1977; and Lewicki, Kmietowicz and Kmietowicz 1985).

Within the Frankish Empire there is much evidence regarding the existence and control of trade: toll stations flourished along the river systems and at Alpine mountain passes; and there were nine toll stations on the marches between the Franks and the Slavs, authorised transit points for inland trade. These nine toll stations stretched from Bardowick in the north to Raffelstetten and Lorch on the Danube in the south (McCormick 2001, 639-44). Throughout northern Europe, merchants travelled the seas, coasts and river systems, moving goods on both a large and small scale between towns, ports and inland authorised transit points. Merchants also settled in foreign towns, their contacts (and perhaps also their wealth) assuring them status. There are many examples of settled Jewish mercantile communities – and of merchants acting as foreign ambassadors and spies. One such early example in the Slavinic territories is that of Samo, a Frankish merchant in the 7th century AD. On the western edge of the Avar-Slav cultural zone in AD 623, Samo (who had been trading with the Slavs) become the leader of a Slav revolt against their Avar overlords (*Chronicarum quae dicuntur, Fredegarii scholastici, libri IV*: the Chronicle of Fredegar (c. AD 660-70), which referred to the Slavs as 'Wends'). Samo become the ruler of a Slavonic territory and political organization that is usually referred to as a state (although only on the grounds that Fredegar used the term 'rex', which may simply refer to a chief). Samo died some time between AD 658 and 669 after thirty-five years of ruling the Wends and raiding in the west. His 'state' promptly disappears from history.

Jewish merchants and travellers

The first millennium AD saw a great diaspora of Jewish communities throughout Europe and the Middle East. Under Charlemagne, Jewish communities flourished in the reunited Europe, migrating further north into France and Germany. However, they were very different to the land-owning aristocracies and established peasantry, most preferring the growing towns to the feudal estates of the countryside. However, during the preceeding centuries, Jewish alodial landholders were not unknown, particularly in the southwest of France. Alodial landholders (where the land is held without obligation to any feudal lord except the king) were obligated to perform military service in a local levy – and Jewish soldiers fought in Charlemagne's Spanish campaigns (Bachrach 1977, 66-71).

Fig. 5. An illustration of a Jewish merchant from the *Hortus delicarum der Herrad von Landsberg* (12th century AD), carrying a weight and balances (after Steuer 1997, 351).

Charlemagne also encouraged Jewish mercantile activity (Fig. 5). The Jewish cultural network encompassed the European Mediterranean and Byzantium – and the extensive commercial trade routes of the Islamic World, stretching all the way to India and China. Luxury goods such as textiles, spices and perfumes found favour with the north European kings and nobles – and the practice of usury, prohibited to Muslims and Christians alike, brought them into

contact with native merchants. Charlemagne's encouragement of Jewish mercantile activity was a success, but it was partly dictated by circumstances beyond his control. The Islamic expansion had severely curtailed the activities of the Syrian Christian merchants who had previously dominated trade within the Mediterranean region. The rise of the Jewish merchant during the Carolingian period was both a result of their taking an increased role in a diminished market and as a result of hostilities between Muslims and Christians (Bachrach 1977, 72). Jewish merchants were tolerated in both spheres, becoming both commercial intermediaries and official diplomatic representatives. As official representatives, the Jews from Muslim or European countries were treated kindly in their diplomatic functions. As most were indeed merchants, they subsequently also enjoyed a good commercial position.

The Radanites, Jewish merchants from the Rhone Valley, were particularly prominent in the long distance trade of the period, travelling throughout the Christian and Islamic territories and further. Ibn Kurradadhbah (who died in AD 912) wrote *Kitab al-Masalik wal-Mamalik* (The Book of Roads and Kingdoms) and describes the activities of the merchants whom he knew as Radanites:

"These merchants speak Arabic, Persian, the languages of the Roman Empire, of the Franks, the Spanish, and the Slavs. They go from west to east and from east to west by land and by land and sea. From the west they carry eunuchs, female and male slaves, silken cloth, various kinds of fur, and swords. They ship out from Frankish territory on the Mediterranean Sea and head for Farama in the Nile delta. There they unload their ships and put their goods on camels to travel by land to Qulzum at Suez. This trip takes about five days. They then reload their goods on ships and set sail on the Red Sea from Qulzum to al-Jar the port for Medina and then to Jidda the port for Mecca. Then they head for Sind, India and China. On the return trip from China they carry musk, aloes, camphor, cinnamon, and other goods from the eastern lands to Qulzum and onto Farama. From there they cross the Mediterranean again. Some of the merchants sail to Constantinople in order to sell their goods to the Byzantines. Others go to the palace of the king of the Franks to sell their wares. Sometimes these Jewish merchants take a different route when they leave the kingdom of

the Franks and sail on the Mediterranean to Antioch. From there they travel to al-Jabiya. This takes three days. Then they load their goods on a boat that sails on the Euphrates to Baghdad. From Bagdhad they sail down the Tigris to al-Ubullah. They leave al-Ubullah and go on to Oman. From Oman they go to Sind, India, and China. All of these routes are interconnected and links can be made overland. Merchants leaving from the Frankish kingdom or from Spain sail across the straits of Gibraltar to North Africa and then to Tangier. They cross North Africa to the capital of Egypt. From there they go to Ramla. They stop at Damascus and then go on to Kufa, Baghdad, and Basra. Then they cross to Ahwaz, Fars, Kirman, Sind, and then India. Finally, they arrive in China. Sometimes they take the route that passes on the other side of Byzantium and after crossing the country of the Slavs they arrive at Khamlij the capital of the Khazars. From there they take ship on the Caspian Sea and go to Balkh and to Transoxiana. They continue until they reach the region where the camps of the Tughuzghur are established. From there they go on to China." (translation after Bachrach 1977, 72-73).

Ibn Kurradadhbah's account makes clear the extent of what must have been an already well-established network. He wrote from his position as director of police and the postal service in the province of Jibal and, as a spymaster, it may be assumed that he came into contact with his subject.

The accounts of the Jewish traveller Ibrahim ibn Ya'qub were preserved by the Arabic writers Al-Bakri, Al-Qazwini, Al-'Udri and Al-Himyari. Ibn Ya'qub had well-founded knowledge of the Jewish community in Europe. It seems that Ibrahim ibn Ya'qub was a man of wide interests; he worked as a physician, financier, a diplomat, traveller and most significantly as a merchant. During his travels in AD 965 (as part of an embassy from the caliph of Cordoba to Otto I) he visited the countries of the Western Slavs. His accounts contain much information in regard to the countries of the Slavs and their early kingdoms. He also visited Prague, which was considered the main trading centre in central Europe:

"Bohemia... is the land of King Boyslavits, the distance from the city of Prague to that of Cracow is three weeks journey and its frontier is lengthwise with that of the Turks [here used to describe the Magyars]. *The city of Prague is built of stone and mortar and is the richest in trade of all these lands. The Russians and the Slavs bring goods there from Cracow; Muslims, Jews and Turks from the lands of the Turks also bring goods and mitkal* [Arabic coins]; *and they carry away slaves, tin and various kinds of fur. Their country is the best of all those of the northern peoples and the richest in provender. For one small coin, enough flour is sold there to suffice a man for a month, and for the same sum enough barley to fodder a riding animal for forty nights; ten hens are sold there for one penny. In the city of Prague they make saddles, bridles and the flimsy leather bucklers that are used in those parts, and in the land of Bohemia they make light fine kerchiefs like nets, embroidered with crescents which are of no use for anything. Their price there at all times is ten kerchiefs for a penny. With these they trade and deal with one another and they possess jars of them. They regard them as money and the most costly things are bought with them, wheat, slaves, horses, gold, silver and all things."* (translation after Barford 2001, 255; and Labuda 1999, 148).

Accounts such as this not only illustrate the period and provide information about the people and their society, but can prove invaluable in interpreting archaeological finds. Similar linen handkerchiefs (used as currency) were discovered during the excavations at the 9th century cemetery of Uherskė Hradiště-Sady, Great Moravia (Dzieduszycki 1995, 101).

The importance of Jewish merchants within the Carolingian economy may be illustrated by the many exemptions made for them by various emperors in relation to Roman law. For example, while the Carolingians were encouraging the growth of Jewish immigration (even recruiting celebrated scholars such as Kalonymus of Lucca, whom Charlemagne persuaded to settle in Mainz), they also 'relaxed' the prohibitions on building new synagogues. The restrictive Roman laws pertaining to Jewish slave ownership (including trade in slaves) were abolished (Bachrach 1977, 86). This was of particular importance, for the

dominant role of Jewish merchants within the European slave trade cannot be underestimated.

Indeed, such was the importance of Jewish trade within the Carolingian Empire that a formulary was developed by Louis the Pious in relation to the protection of Jewish mercantile interests. Such formularies or models were used in imperial writing offices when drafting documents and charters. The special formulary was similar to one intended for non-Jewish merchants in that it listed a number of toll, tax and service exemptions of benefit commercial activity at a local level, within the Empire and beyond the borders of Empire – but it also contained clauses specific to Jews (Bachrach 1977, 90). The formulary included exemptions from all general road tolls, from mooring dues at ports, from dues imposed on merchants at town gates, from bridge tolls and from duties such as the requirement to supply horses to government officials or to perform work in support of public services (Bachrach 1977, 95). It also included a specific statement regarding the right of Jewish merchants to buy and sell pagan slaves (trade in Christian slaves was generally frowned upon).

In protecting and encouraging Jewish commercial activities, the Carolingian emperors often clashed with the Christian church – but the secular concerns of economic wealth and development overruled the ecclesiastical complaints. However, the imperial pro-Jewish policy was not to remain unchallenged; following the break up of the Carolingian empire after the death of Louis the Pious in AD 840, royal power was weakened while the political power of the church grew.

Scandinavian merchants

The early Islamic world had a strong tradition of intellectual inquiry, including medicine, the sciences, philosophy and geography. A huge number of geographic works were written during the early period (c. the 8th – 12th centuries), the authors of which were either travellers themselves or used the reports of others (using a wide range of sources, from merchants and ambassadors to slaves). They also used older works concerning geography

and travel and covered areas from Western Europe to Eastern Asia (Lewicka-Rajewska 1997, 223). These written sources have proved invaluable in providing detail to our understanding of early towns and trade in the Baltic Sea region.

One such example is that of Ibn Fadlan, an official sent in the name of the Caliph Al-Muqtadir on a diplomatic mission in AD 921-922 to the court of the king of the Bulgars on the Volga River. During his travels he met many different merchants – including Scandinavian Rus:

"The moment their boats reach this dock every one of them disembarks, caring bread, meat, onions, milk and alcohol and goes to a tall piece of wood set up [in the ground]. *This piece of wood has a face like the face of a man and is surrounded by small figurines behind which are long pieces of wood set up in the ground.* [When] *he reaches the large figure, he prostrates himself before it and says, "Lord, I have come from a distant land, bringing so many slave-girls* [priced at] *such and such per head and so many sables* [priced at] *such and such per pelt." He continues until he has mentioned all of the merchandise he has brought with him, then says, "And I have brought this offering," leaving what he brought with him in front of the piece of wood, saying, "I wish you to provide me with a merchant who has many dinars and dirhams and who will buy from me whatever I want* [to sell] *without haggling over the price I fix." Then he departs. If he has difficulty in selling* [his goods] *and he has to remain too many days, he returns with a second and third offering... Sometimes business is good and he makes a quick sell, at which point he will say, "My Lord has satisfied my request, so I am required to recompense him." He procures a number of sheep or cows and slaughters them, donating a portion of the meat to charity and taking the rest and casting it before the large piece of wood and the small ones around it."* (translation after Montgomery 2000, 9-10).

Ibn Khurradadbih in *Kitab al-Masalik wal-Mamalik* (The Book of Roads and Kingdoms) also described Rus merchants:

"They are a tribe from among the as-Saqaliba [the Slavs]. *They bring furs of beavers and of black foxes and swords from the most distant parts of the Saqlabiya* [lands of the Slav] *to the sea of Rum* [Black Sea] *where the ruler of ar-Rum* [Byzantium] *levies tithes on them. If they want, they travel on the Itil* [the Don], *the river of the as-Saqaliba and pass through Khamlij, the capital of the Khazars,* [where] *the ruler of it levies tithes on them. Then they arrive at the sea of Gurjan* [Caspian Sea] *and they land on that shore of it which they choose... On occasion they bring their merchandise on camels from Gurjan to Bagdad, where as-Saqaliba eunuchs serve them as interpreters."* (translation after Boba 1967, 27-28).

These northern and north eastern European travellers and merchants seldom left accounts that have survived to today. However, one interesting geographical account does survive within the contemporary appendices of a translation into Old English of the *Historiarum adversum Paganos Libri Septem* (Seven Books of History against the Pagans), a text written in the early years of the 5th century by the Spanish churchman Paulus Orosius (Lund 1984, 5). It is thought that the Old English version of Orosius belongs to a group of translations undertaken jointly at the Court of King Alfred in the late 9th century. An appendix was added at the time of translation, containing unique firsthand descriptions of voyages in the White Sea and in the Baltic by two travellers, Ohthere and Wulfstan, who were visitors at King Alfred's court. Linguistic differences between the tales of Othere and Wulfstan do indicate that the texts came from two different sources (Cuesta and Silva 2000, 18). Ohthere was a rich Norwegian merchant and farmer from Halgoland, on the coast of Norway. He sailed north into the White Sea, later making a second voyage south, to Hedeby. Wulfstan was perhaps a Mercian – he travelled in the Baltic from Hedeby to Truso, an early town at the mouth of the River Vistula. Although brief, these accounts are valuable historical sources in regard to geography, agriculture, hunting, customs and trade in Scandinavia and the Baltic in the late 9th century.

The Scandinavian merchants who travelled the river systems of the 'northern arc' were, by nature and necessity, a mixture of warrior and merchant. The

word 'Varangrian', used in the Byzantine and Muslim lands to describe the Scandinavian merchants newly arrived in the east, is probably derived from the Scandinavian word *vár*, meaning 'oath' or 'pledge'. The Scandinavian travellers had to be warriors as well as merchants, given the hazards of their long journey. As a result, bands of Scandinavians who travelled eastwards joined formally as companies, swearing oaths of mutual assistance. One example of archaeological evidence reflects this mixture of warrior and trader: the grave of a Scandinavian that was discovered during excavations at the 10th and 11th century cemetery of Ciepłe near Gdańsk, Poland. The warrior was buried with an iron sword (with its pommel and hilt inlaid with silver and bronze), an iron spearhead, a damaged iron spur and various other horse fittings – and parts of a bronze scale and nine or ten iron bronze-covered spherical weights with flat poles (Kara 1998, 505-24; Żak 1957, 164-180).

However, while the archaeological evidence of mercantile activities is often restricted to the commodities of trade (goods, silver coin and hacksilver etc) and the tools of trade (weights and scales etc), the merchants or traders of the 'northern arc' are not usually so readily visible (although the merchants themselves are often assumed to be Scandinavian). One further fascinating exception is the grave that was found during the excavation of a 10th or 11th century cemetery in Sowinki, near Poznań, Poland (Krzyszowski 1993; 1995; and 1997). Grave number 70 was very different to the others. It contained a young male who had probably been wrapped in a shroud. He was buried with fishing equipment, a portable scale and a remarkable set of nineteen weights of assorted types. Of the nineteen weights recovered, six were spherical and made of iron with bronze coating, twelve were of lead in a variety of shapes (spherical, disc-shaped, cone-shaped, globular, die-shaped and brick-shaped) and one was a stone of a particular weight (perhaps a replacement). These weights suggest a variety of different provenances – and almost certainly mark the young man as a merchant. However, it is not known whether he was Slavonic or Scandinavian.

Slavonic merchants

As noted previously, Ibn Khurradadbih in *Kitab al-Masalik wal-Mamalik* ('The Book of Roads and Kingdoms') described Rus merchants as "*a tribe from among the as-Saqalib* [the Slavs]", their trade routes reaching Baghdad "*where as-Saqaliba eunuchs serve them as interpreters*" (translation after Boba 1967, 27-28). The implications are that the 'Scandinavian' Rus and the Slav were indistinguishable to the Arabic observer.

We also have information about Slavonic merchants from other parts of the medieval world. Writing towards the end of the 11th century, Adam of Bremen in the *Gesta Hammaburgensis ecclesiae pontificum* ('History of the Archbishops of Hamburg-Bremen') described the Swedish fortified market town of Birka. He records that the difficult man-made and natural seaward defences along the approach to Birka would have necessitated the prior welcome and trust of any foreign merchant.

"*Björkö is a town of the Goths situated in the middle of Sweden not far from the temple called Uppsala, which the Swedes consider the most eminent in the cult of their gods. At that place a bight of the sea which is called the Baltic or Barbarian Sea by extending northward forms a desirable, but to the unwary and those unacquainted with places of this kind a very dangerous, port for the barbarous tribes that lie spread about this sea. For the people of Björkö, very often assailed by the inroads of pirates, who are numerous there, have set about deceiving by cunning artifices the enemies who they could not resist by force of arms. They have blocked that bight of the restless sea for a hundred or more stadia by masses of hidden rocks, making its passage as perilous for themselves as for the pirates. In this haven, the most secure in the maritime regions of Sweden, all the ships of the Danes and Northmen, as well as those of the Slavs and Sembi* [Prussians] *and other Scythian people, are wont to meet at stated times for the diverse necessities of trade.*" (translation after Tschan 2002, 51-52).

Just as Birka was open to those merchants that were welcome, so to was Wolin on the southern Baltic coast. One of the excavated houses is very likely to have been built by a Scandinavian: its plan and construction is foreign to Wolin, while it contained fragments of furniture of Scandinavian design and, perhaps most tellingly, pieces of wood inscribed with runic inscriptions and fragments of soap stone vessels. Adam of Bremen later described Wolin as being inhabited by many foreign merchants, although he noted that Saxons were instructed to practice their Christianity behind closed doors.

Commodities and cargoes

Turning from the merchants to consider their wares, it is useful to remember that while the historical record may highlight some aspects of early medieval trade (slavery, for example) it may ignore others (such as agricultural products), just as the archaeological record may recover widespread evidence of trade (such as silver hoards or pottery) but be unable to detect aspects that leave little or no physical trace (the spice trade). In terms of historically documented goods transported within, imported to and exported from the Frankish empire, McCormick (2001) provides a masterful overview. He details evidence of salt, grain, pottery, timber and metals (internally-traded goods); of high-value, low-bulk goods such as spices, incences and silk (imported goods); and of high-value furs, high-quality Frankish weapons and slaves (exported goods). That such goods were traded is not in doubt – but what of the Baltic Sea region?

Precious metals as a commodity

Throughout the early medieval period, most of Baltic Sea region was without a true coin-based economy; instead, silver and gold were treated as bullion. In the Viking period, silver was obtained in vast quantities from the east in the form of Arabic silver coins which were normally then melted down and cast into ingots for compact storage or made into jewellery which could be worn as a conspicuous display of wealth. Both ingots and jewellery could be cut up later if small change was required (known as hack silver). Silver hoards, some of immense value and containing a variety of coins, objects and hack silver, were

buried in the ground and were sometimes not retrieved. One enormous single Russian hoard was found to contain 11,077 dirhams and over 5 kg in pieces of dirhams (Spufford 1988, 67). Payment for goods or services were made in weight of silver; any silver, whether coin, ornament, hack silver or ingots, was valid in this metal weight-based monetary system. The silver was weighed using a small pair of scales, which were designed to fold up and fit into small box for portability. Weights, made of lead, iron or other metals, were used by merchants, chieftains and others to weigh out the silver as required. Viking Age weights have been found as isolated finds and in graves; and at trading centres throughout the Viking world.

The Arabic coins are often found together with hack silver and other forms of non-coinage wealth storage (such as iron bars). The silver coins were considered a commodity, weighed and distributed for their value as silver, rather than as coins in their own right. Much of the Arabic silver coinage reaching the Baltic Sea region was destined to be cut up and fragmented, or melted down and recast into bars, arm-rings or jewellery.

Gold has also been found throughout the Baltic Sea region (although in much smaller quantities). Arabic, Byzantine, English and Frankish coins have been found, alongside jewellery, cut and fragmented jewellery, bars, plates and lumps. Particular attention should be paid to gold in the form of natural lumps, grains and crumbs – and gold in the form of cut or fragmented jewellery. In such forms, the gold can only have been valued as a precious metal, rather than for aesthetic reasons (as jewellery or as symbols of power, for example). There are many historical examples dealing with the use or circulation of gold. One of these examples, from the *Chronica Boemorum* (III, XXIV), written in the 12th century, refers to Brzetysław, a 9th century Czech king. Brzetysław promised to pay a bounty of a 'large lump of gold' to whoever killed the Wršowic family, with whom the king had presumably fallen out (Dzieduszycki 1995, 97).

Gold coin hoards suggest that such coins sometimes served as bullion, but the amounts recovered in the archaeological record would suggest that exchanges

involving gold were comparatively modest. The largest gold coin hoard that has been recovered from Sweden was that of c. 60 Byzantine *solidi* of 6th century date from the early (7th and 8th century) small specialized craft and trade settlement of Helgö (Clarke and Ambrosiani 1995, 71). Compared to the amount and weight divisions of the silver coinage it is clear that a widespread and complex value system in silver was to develop.

The great majority of the silver coins recovered from hoards and excavations around the Baltic Sea region from the early medieval period are Arabic in origin. The silver dirhams came, in part, from the Abbasid caliphate itself, although the great bulk of silver (at the height of the trade in the early 10th century) was Samanid in origin, generated by the rich silver mines in Transoxiana to the east. These dirhams arrived in the region as a result of trade, passing through the Bulgars on the middle Volga and the Khazars on the lower Volga. Well over 230,000 silver dirhams have so far been found from hoards in northern, central and eastern Europe (Rouche 1997b, 513), the majority from Russia but also including 60,000 from the island of Gotland, 45,000 from the rest of Scandinavia (broken down into 40,000 from Sweden, 4000 from Denmark and 400 from Norway) and 25,000 from Pomerania on the southern Baltic coast (Spufford 1988, 67).

Thus, for over two hundred years, spanning the 9th and 10th centuries, exports (of which the commodities are described below) from northeastern Europe to the Islamic world were paid for mainly in silver coins, huge numbers of which have been found throughout Russia and the Baltic. At present, there is information on over a thousand hoards containing five or more silver dirhams (Noonan 1984, 153). Since many of the coins were melted down upon reaching eastern Europe, the Baltic and Scandinavia – and countless more hoards will have been discovered and gone unreported over the intermeding centuries (or are indeed still buried) – the actual number imported from the Islamic world must have been far greater. Some have speculated that there were *millions* of dirhams in Russia, Poland and Scandinavia in the 9th and 10th centuries (Howard-Johnston 1998, 66). The Arabic weight system was adopted (which was originally created for the gold and silver coins) but not the coins

themselves as functional coinage. When coins were introduced later by the formative kingdoms around the Baltic they were introduced in modest numbers, functioning as symbols of power rather than fully-fledged coinage.

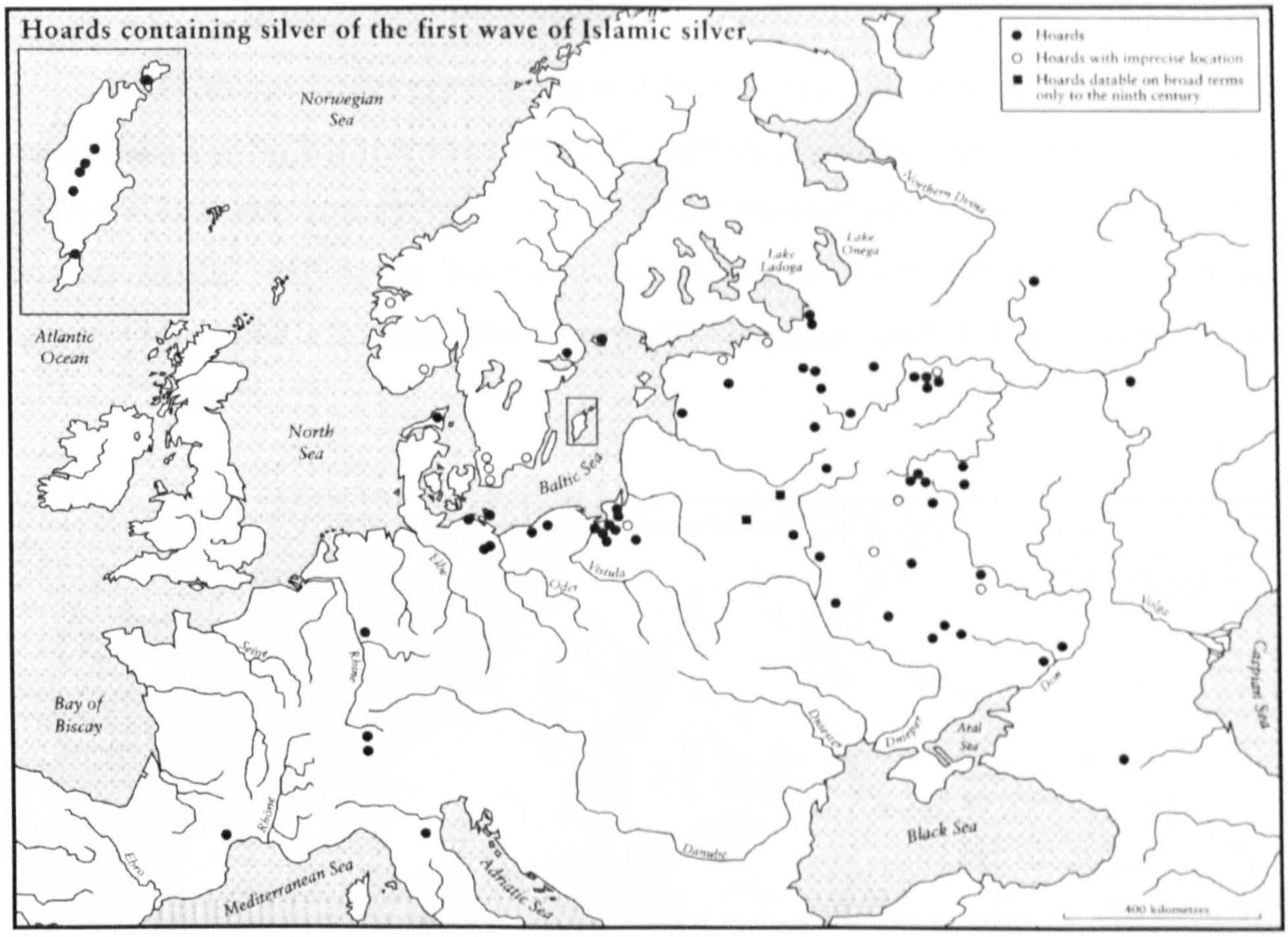

Fig. 6. The distribution of hoards containing silver of the first wave of Islamic silver (after Barford 2001, 376).

In the second half of the 8th century the penetration of Islamic silver began in the territories of Europe, a direct result of the expansion and growth of the Islamic world. The first flood of silver (Fig. 6) embraced the region of the Khazars (today's Bulgaria), most of the territory of the Eastern Slavs and the Baltic costal regions (mostly Scandinavian territory but also the southern coast of the Baltic Sea, occupied by the northern territories of the Western Slavs and the Balts) (Łosiński 1988, 96).

This first phase of the penetration of Islamic silver began to peter out in the AD 830's. However, by the AD 840's the trading relations had resumed – and there was a marked increase of Islamic silver penetration into Europe between the

AD 860's to 880's. This second phase (Fig. 7) soon began to fade; but by the end of the 9th century AD a further flood of Arabic Sāmānid silver dirhams can be seen (spreading as far as Iceland). This third phase had reached its peak during the AD 940's and 950's – around 30% of all the dirhams imported into northern Europe were deposited during these two decades (Noonan 1997, 147) – but had broken down by the second half of the 10th century and stopped completely by the beginning of the 11th century (Łosiński 1993, 2-3). However, while the first two phases are fairly distinct, constant phenomena visible in the archaeological record, the third and longer phase is not constant, the supply being sometimes stronger and sometimes weaker and acting differently in different regions.

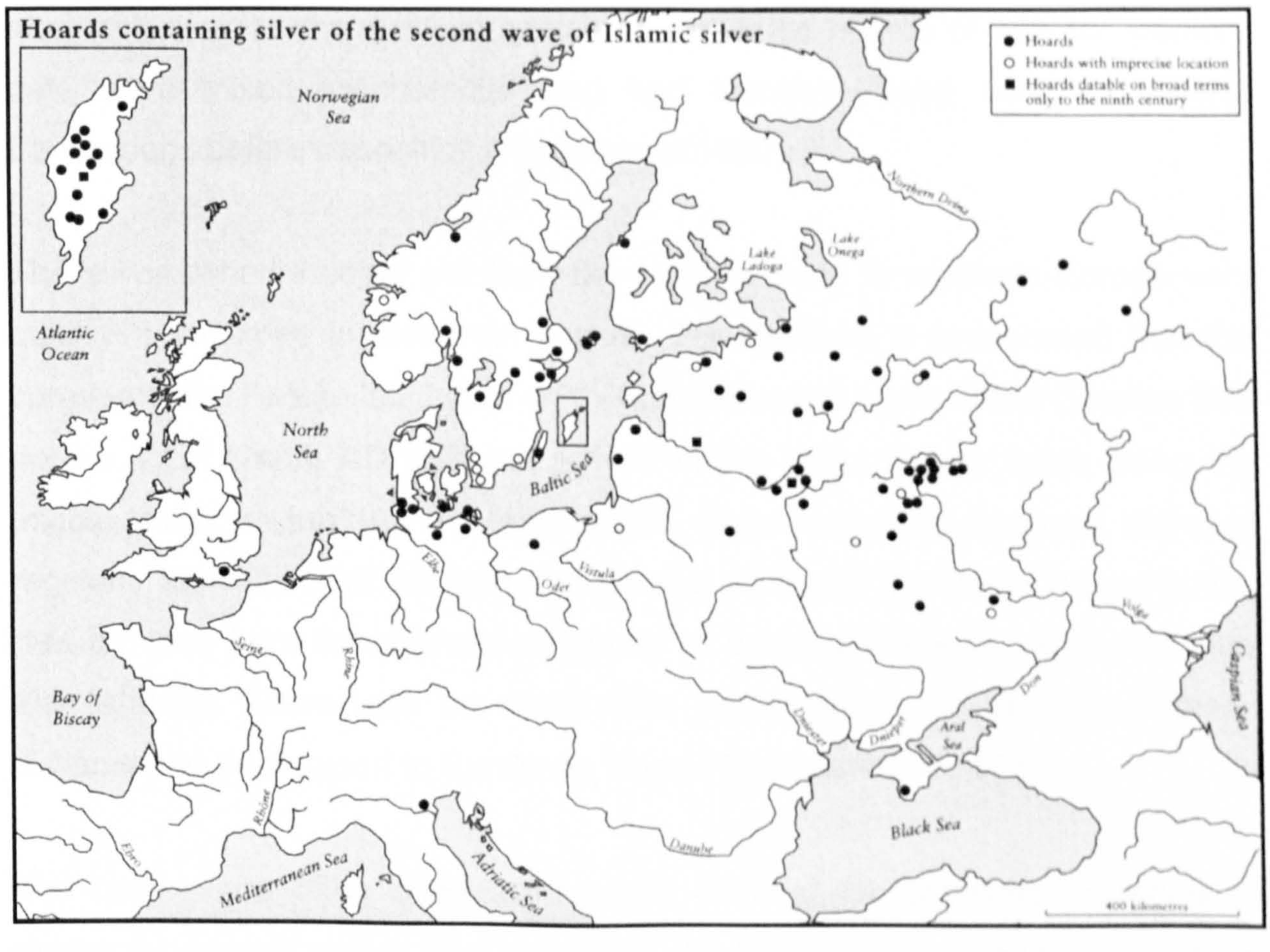

Fig. 7. The distribution of hoards containing silver of the second wave of Islamic silver (after Barford 2001, 378).

To be able to estimate and understand these changes, scholars used chronological analysis of the disposition of Arabic dirhams in silver hoards. Statistical analysis were crucial, working with the huge hoards of Gotland and

the Eastern European territories of the Rus (some of them containing collections of thousands of dirhams) – and comparing the results with the smaller hoards of Scandinavia and the territory of the Western Slavs. Comparisons between hoards of different regions show quite clearly the regularity and routes of movement in the chronological disposition of Arabic dirhams (Łosiński 1993, 3). Indeed, analysis of the hoards from one region can also shed light on that region's contemporary use of the silver. Kiersnowski analysed the dirhams found within the hoards of Pomerania and Greater Poland and concluded that the silver had begun to be used as part of a weight-based monetary currency over the course of the 10th century. The dirhams contained within the hoards of early 10th century date were homogenous in character (in place and date of minting) and had therefore been deposited soon after arrival; while the dirhams contained within the hoards of late 10th century date were mixed in character and had therefore been used in several transactions before deposition (Kiersnowski 1960).

The silver dirhams could get from the Islamic world to northern Europe very quickly, sometimes in less than a year. For instance, it is recorded that the caravan of Ibn Fadlān left Jurjān on the south-eastern coast of the Caspian Sea on the 4th of March AD 922 and arrived in the Volga Bulgar lands along the middle Volga on the 12th of May AD 922. Since merchant caravans travelled regularly between northern Iran and Central Asia and the Volga Bulgar lands, new dirhams from these areas appeared in European Russia very soon after their striking. There was no major time lag between the striking of these dirhams and their export to European Russia (Noonan 1988, 413).

The coins were often used as the raw material for domestic valuables to enhance personal status. The chronicler, Ibn Fadlān, describing the territory of the Volga Bulghārs in the early 10th century AD, records that the Rus (referring specifically to Scandinavians) turned each 10,000 dirhams that were exchanged into a heavy silver neck-ring. The later (Slavonic) Russian weight unit *grivna* (grzywna) originally meant 'neck-ring'. Similarly, the Germanic poem *Hildebrand* describes gold arm-ring made of Roman coins, the rings being a gift to Hildebrand from the king of the Huns, among whom such bracelets were

political insignia. The weight variations in Scandinavian rings, among which especially the gold arm-ring often show adjusted weights of 25, 50 or 100 grams, are perhaps better seen in light of such earlier transformations, rather than as reflecting functional attempts to create a roughly uniform 'ring-money'. The same phenomenon also appears during the Migration Period, when many arm-ring had weights closely related to the Roman *uncia*, suggesting gold *solidi* coins were used as raw material (Gaimster 1991, 117).

Ibn Fadlān records that: "*whenever a man's wealth reaches ten thousand dirhams, he has a band made for his wife; if it reaches twenty thousand dirhams, he has two bands made for her – for every ten thousand more, he gives another band to his wife. Sometimes one woman may wear many bands around her neck*" (translation from Montgomery 2000, 7).

Another symbolic function (rather than a practical and economic function) can be seen in the Scandinavian 'pendant-rings', a type of arm-ring with sets of smaller rings attached to it. It could be suggested that the small rings served as weight-adjustments; however, the pendant-rings do not show any real weight standards themselves. They may be compared with the rings described in *Baugatal*, the Icelandic law on blood money, where it is started each ring should be followed by a certain worth in *ringdaekke* and *hvid* (*Grágás*). The true meaning of these weight units is unknown, but a connection with the 'extra' little rings is suggested and perhaps shows that the pendant-rings were such specific blood money (Gaimster 1991, 117-18).

Fig. 8. Weighing money: a mid-12th century English copy of the *Eadwine Psalter*, originally from Utrecht and dating to around AD 820 (after Steuer 1997, 276).

However, silver was definitely the predominant commodity for acquiring and distributing wealth, requiring the widespread use of weights and scales – and the development and spread of commonly accepted weight systems. This illustration (Fig. 8) is from a mid-12th century English copy of the Eadwine Psalter, originally from Utrecht and dating to around AD 820. The king watches two servants tip money from sacks onto a table, while another weighs the correct amount due to each of the waiting soldiers. This can be used to illustrate the historic account from Ibrahim ibn Yaqub in the 10th century of King Mieszko I of Poland using taxes raised in silver to pay the wages of his standing army: "*The country of Mieszko* [Poland] *is the largest of all their* [Slav] *countries. It is rich in food and meat and honey and fields. The taxes which are collected by him are paid in mitqual* [coins]. *These also form the salary of his men… he has 3000 men in armour… and he gives to these men clothes,*

horses, weapons and everything they need" (translated from Labuda 1999, 148). Although there is some confusion as to the translation of the original source, it would appear that the taxes were raised in silver measured by weight; and that the soldiers also received silver measured by weight (Kubiak 1956, 368-76). Ibrahim ibn Yaqub talks of the taxes raised as 'mitquals' – and it would be reasonable to infer that this was largely Arabic silver measured using an Arabic-influenced weight system (Labuda 1999, 148).

The Arabic silver dried up in the mid-10th century, perhaps as a result of the Samanid mines themselves being worked out. By the early eleventh century, the Islamic world itself was suffering from a shortage of silver (Spufford 1988, 72). This led to a growing debasement of newly minted dirhams: coins that had a silver content of around 90% in the year AD 1000 had declined to a silver content of around 5% only half a century later (Noonan 1997, 151).

However, northern Europe did not suffer any consequences as far as the supply and use of silver is concerned. Silver mines were discovered in central Germany in the mid-10th century and the prosperity and importance of Ottonian Germany and Anglo-Saxon England began to grow. New towns sprang up across north western Europe – but this time they grew from existing religious, military or administrative centres, as markets and mints were set up by royal decree to facilitate (and better control) trade (Spufford 1988, 75). Scandinavian and Western Slavonic economic life changed orientation and indigenous coinage began to appear (albeit temporarily). As Spufford notes, "one might almost think of the [11th] century as witnessing the real start of a money economy in western Europe" (1988, 77).

Slaves

Slavery was common throughout Europe and the Islamic world. Many historical sources reveal the presence in Western Europe during the 7th and 8th centuries of large numbers of men and women referred to as *servi* and *ancillae*, or designated as *mancipia*. There was no aristocratic household, lay or ecclesiastical, that did not contain domestic staff of servile status. Throughout

the Islamic world slaves were used as domestic staff and in harems. This servile population was replenished simultaneously by natural procreation, warfare and trade. Slaves were used in gangs on farms, plantations and in quarries and mines. They were used in industry and on building projects. They formed the backbone of the Islamic *Mamluk* armies.

Fig. 9. Slaves in Cordoba: from a 13th century illustration in *Cantigas d'Alfonso X* (after Bresc and Guichard 1997c, 188).

Islamic society also practiced slavery – but forbade the enslavement of any Muslim or, indeed, any law-abiding non Muslim taxpayer, although the acceptance of Islam did not grant freedom to an enslaved person (Nazmin 1998, 184). Slave labour was therefore acquired from lands outside the Caliphate, either by tribute, capture or simply purchase. Thus the slave trade brought new wealth into Slavonic Europe. It has been argued (Heather 1997,183) that the 'blank area' on the distribution map of Islamic silver in northern Europe between the Scandinavian Rus in European Russia and the

Western Slavs of Pomerania was filled by eastern Slavs living in dread of their more powerful neighbours – and that the large quantities of Arabic silver found in the regions occupied by the western Slavs must partially reflect this practice. However, slaves (known in the Islamic world as *Saqāliba*, or Slavs, a fact often used in modern histories to simply identify all Islamic slaves as Slavonic in ethnicity) were also acquired from the Mediterranean. Many Arabic sources refer to slaves arriving via the Umayyad Emirate of Cordoba (Fig. 9). Although some of the slaves were captured in the wars against the northern Spanish states, or during raids by Andalusian pirates on the northern Mediterranean coasts (and were therefore Christian), many arrived from Prague having travelled overland across the Frankish Empire (and were therefore pagan). According to recent research, Muslim Spain from the 9th century was especially known for the export of Christian European slaves – also known as *Saqāliba* (Nazmi 1998, 188-89).

In early medieval Europe the ethnic Latin term for the Slav was *Sclavus* – and to its ethnic meaning was soon added a further, that of slave. The trade in Slavonic slaves probably developed in the late 7th century and seems to have been associated both with a period of expansion in the slave trade itself and with a disconnection with the interior market, the slaves seemingly destined for export (McCormick 2001, 738-40). The use of slaves within the Carolingian Empire (except those regions on the eastern borders) seems to have been in gradual decline (Rouche 1997b, 492).

The Slavonic slaves were likely captured and enslaved as a result of raids and warfare, as likely as not perpetrated by rival Slavonic groups and mercenary bands. Those transported into Western Europe often arrived via Prague, a major 'collection point' – and the trade routes continued overland via Frankia to Cordoba in the Umayyad Emirate or overland via the eastern Alps to Venice to be transported by sea. They were often castrated for use as eunuchs (Lewicki 1952, 481-89). The first recorded attempt by the Venetians to supply the Islamic world with slaves came in c. AD 748 and, over the following century, the Venetian slave trade flourished (McCormick 2001, 753).

Despite their unfortunate role within the European slave trade, the practice of slavery in Slavonic lands may not have occurred as there is no record of slaves as a distinct group in Slavonic society (Leciejewicz 1990, 280). Early written evidence, the 6th century Byzantine text the *Strategikon*, a 'manual of war' said to have been written by the Emperor Maurice I (ruled AD 582 – 602), states that the Slavs were a hospitable people who did not keep prisoners indefinitely, "but lay down a certain period after which they can decide for themselves if they want to return to their former homelands after paying a ransom, or to stay among the Slavs as free men and friends" (translation after Barford 2001, 148).

In a world dominated by religion, the slave trade flourished only because of the availability of the pagan or infidel. Muslims did not enslave fellow Muslims, while the Christian church discouraged the capture, use or sale of Christians. The pagan Slav was an obvious target for the Christian west, while the Islamic world could utilise Slav, Christian, African and Turk alike. That Jewish merchants, themselves outsiders, should play such a large role in the European slave market could be considered unusual. However, when the attitude and treatment of the Christian church and rulers towards all heathens, heretics, pagans and Muslims is compared to the favourable position afforded to Judaism and the Jewish merchants, such a role no longer appears outlandish. There were dissenting voices, however. In AD 845 the bishops assembled at the Council of Meaux condemmed all West Frankish slave traders, explicitly including Christians and Jews (McCormick 2001, 774).

That the slave trade within continental Europe and Africa was conducted on a truly huge scale – one 8th century Islamic campaign in north Africa netted 300,000 captives, all destined for slavery (Man 1999, 72), while Charlemagne enslaved 'one third of the Saxon nation' during a campaign in AD 796 (McCormick 2001, 772) – the trade by the Rus on the 'northern arc' may not have been dominated by Slav slavery. Ibn Fadlan's accounts of the activities taking place in the Volga town of Bulgar make it clear that slave trading there was on a comparatively small scale. There is a limit to the number of slaves that can be transported by ship – and there were other, more valuable commodities to be carried.

Furs

Fur was a luxury commodity in great demand in the Caliphate as a symbol of wealth. When the Abbasid Caliph Harun al-Rashid died in AD 809, there was said to have been a stock of four thousand *ğubba* (coats) lined with sable, fennec and other various furs in his treasury (Duby 1974, 31-32; Nazmi 1998, 198-99). The wearing of fur was clearly very popular among the elites of the Caliphate, including wealthy governors, high officials and merchants – and this popularity created an insatiable demand within the markets. The most precious furs of the highest quality came from the north-eastern Europe (Nazmin 1998, 199-200).

Arabic and Muslim historical sources describe the many kinds of furs which were imported into the Caliphate, including ermine, sable, squirrel, fennec, fox, marten and beaver. Many types of clothes were made from these furs, including dresses, coats, quilts, bonnets and slippers – even fur socks (Nazmi 1998, 202-203). While the Mediterranean civilisations of antiquity viewed the wearing of fur with disdain, as the practise of the barbarian, the Muslim world embraced it as a symbol of luxury and wealth. Fur was transformed from the garb of the alien outsider to an accepted part of the dress of high-ranking Muslims – and, during the course of the 9th century, demand for fur rocketed (Howard-Johnston 1998, 75).

Even a relatively small number of wealthy individuals can generate a high demand for pelts. An extreme example of the scale of demand created by the wardrobe of a single individual is that of a single 'robe' of King Henry IV of England: an outfit consisting of nine separate garments, incorporating nearly 12,000 squirrel and 80 ermine pelts. In the case of the Caliphate in the 9th and 10th centuries, however, it is not simply a small number of wealthy individuals (nor a society lacking in purchasing power or products to sell in exchange). The Caliphate was a highly urbanised society with a rich elite, capable of absorbing huge quantities of furs and paying high prices for them (Howard-Johnston 1998, 74-75).

The 'northern arc' supplied the Islamic world with the furs that they desired, the Scandinavian traders playing the role of middlemen between the Slavonic hunters and trappers that were spread over the forests of the north and the Muslim merchants who met them at towns such as Bulgar on the Volga river. Indeed, Arabic historical sources often noted that the Rus merchants travelled from the most distant parts of the land of the *Saqāliba* (the Slavonic lands) in order to participate in the fur trade (Nazmi 1998, 202) – and that the Bulgars and Khazars used to collect furs in tax from their subjugated people (Nazmi 1998, 199). Similarly, the Russian *Primary Chronicle* (or Nestor Chronicle), a history of the Rus compiled in Kiev in AD 1113, records for the year AD 883 that the Drewlanie (an Eastern Slavonic tribe) paid their tribute to Oleg of Kiev (a Rus prince) in black marten pelts (Lewicki 1954, 116). Indeed, just as the *tiraz* of the Abbasid Caliphate distributed ceremonial robes to its officers, officials, princes and ambassadors (Bresc and Guichard 1997b, 268), *Ejmund's Saga* records that the Princes of Kiev were expected to supply their warriors with "*gold, silver and fine raiment*" (translation after Kirpičnikow 1970, 55). The birch-bark letters from Novgorod provide evidence that furs were taken as taxes in the far-northern areas – including the tundra – and delivered to Novgorod (Rybina 1992, 163-64); while archaeological excavations and survey in the Beloozero region indicate at least 144 dwelling sites (all but three undefended) and 15 burial sites dating from a period of colonisation (material culture includes elements of Slavonic, Scandinavian, Baltic and 'native' Fenno-Ugric origin) during the 10th to 13th centuries (Makarow and Buzhilova 1997, 183-85).

Archaeological evidence of the fur trade also includes blunted arrowheads of iron and bone (designed to avoid damaging the pelt), found in the territory of the Volga Bulgars (Howard-Johnston 1998, endnote 6); and discoveries such as the huge numbers of bones from fur-bearing animals recovered from recent excavations at Birka. The most common species found at Birka are fox, squirrel and pine marten; rarer species are brown bear, beaver, wolf, lynx, ermine, badger, otter, polecat and wolverine. The only parts of the more common species that are represented in the archaeological record are the bones of the paws – the rest of the animal having been left where it was trapped, killed and

skinned. The final processing of the fur took place in Birka, where the paws were removed. The preparation of furs and their trade seems to have existed from the foundation of Birka in the middle of the 8th century until the town was deserted in the late 10th century. The processing of furs seems not to have taken place in specific houses or workshops, but most probably was dispersed throughout the 'ordinary' households of Birka – and probably reflected trade in furs with the far north. The wolverine, for example, is today only found in Lapland, the most northern part of Sweden (Wigh 1998, 86-89).

Quality furs also fetched high prices in western Europe. Writing in the late 11th century, Adam of Bremen in his historical and geographical chronicle *Gesta Hammaburgensis Ecclesiae Pontificum* ('Deeds of the Bishops of the Hamburg Church') wrote of the Prussian Balts that "*they have an abumdance of strange furs, the odour of which has inoculated our world with the deadly poison of pride. But these furs they regard indeed as dung, to our shame, I believe, for right or wrong we hanker after a martenskin robe as much as for supreme happiness. Therefore they offer their very precious marten furs for the woollen garments called faldones*" (translation after Ellis Davidson 1976, 97).

Al-Muqaddasi, a notable Arabic geographer and traveller, writing about AD 985, listed the goods that were available in the town of Bulgar on the Volga river as "*sables, minever, ermines and the fur of steppe foxes, martens, foxes, beavers, spotted hares and goats; also wax, arrows, birch bark, high fur caps, fish glue, fish teeth, castoreum, amber, prepared horse hides, honey, hazel nuts, falcons, swords, armour, khalanj wood, Slavonic slaves, sheep and cattle*" (translation after Barthold 1968, 235). It is noticeable that firs are listed first and at length. Al-Mas'udi, a major early 10th century Arabic historian and the author of *Muruj adh-dhahab wa ma'adin al-jawahir* ('The Meadows of Gold and Mines of Gems'), noted that of all the skins available, the black fox was the most valued; such a pelt would cost at least 100 dinars (Ellis Davidson 1976, 99). It is likely that the demand and high price of black fox furs in the Abbasd Caliphate was created by the fact that black was the symbolic colour of the dynasty (Nazmi 1998, 203).

Another notable material which appears sporadically in Arabic reports of trade are the bones and teeth of animals imported to the Muslim world from the furthermost regions of Eastern Europe. In the 12th century, the Muslim traveller Abu Hamid al-Garnati wrote of large bones and tusks, excavated in the land of the Bulgars. The author described these tusks as ivory of a white colour that was as heavy as lead, adding that they could be made into combs, boxes and small pots. These huge bones and tusks, which were similar to ivory and elephant bones, were probably the bones of extinct mammoths (Nazmi 1998, 206).

Other commodities that have been suggested as having been traded south on the 'northern arc' from Scandinavia are iron and especially weapons. Ibn Kurradadhbah (who died in AD 912) wrote *Kitab al-Masalik wal-Mamalik* ('The Book of Roads and Kingdoms') and recorded that the merchants of Rus came with swords and furs to the Black Sea and the Caspian and sometimes even as far south as Baghdad (Jansson 1987a, 791). That high-quality Frankish swords were manufactured in great quantities and traded over long distances is not in question. In 1970, Kirpičnikov noted that in European collections of early medieval swords from the 9th to the first half of the 11th century no less than 115 swords have the mark of the Frankish *Ulfberht* workshop, 22 of which were found in the Russian east (1970, 59-61) – although it has since been noted that incorrectly spelled Ulfberht swords may well be copies made by illiterate smiths (Stalsberg1988, 451). However, despite trade embargoes concerning the trade in arms (such as Charlemagne's *Capitulary of Diedenhofen* of AD 805) it is clear that western Frankish swords did reach the Scandinavian and Slavonic lands to the east.

Exotic items and goods were probably also traded north on the 'northern arc' from the Islamic world – the trade did not only involve silver. Interesting finds include the fragments of silk found in graves at Birka (Meier 2006, 96), a Budda figurine from the Kashmir and dating from the 6th or 7th century and an Egyptian Coptic bronze cup from the same period that were both found in Helgö (Noonan 1986, 325). A later historical reference involves the trade in unusual animals: Mieszko I of Poland presented a camel to the young Otto III (Strzelczyk 2000,

114). However, the trade in more everyday commodities, from raw materials such as timber and metal ore to agricultural produce such as honey and wax is detailed in the following chapter – for it is within this trade that one may more easilly identify elements of standardisation and thus implications towards regularlised trade.

Having described the historical context of the early medieval world of commerce – the origins within the late Roman Empire; the growth and influence of the Islamic world; the expansion of the Frankish Empire; and the arrival of the Slavs – and investigated the growth of towns on the Baltic coast and the relationships of the various peoples involved, we can now turn our attention more fully to the mechanisms and commodities of trade within the Baltic Viking Age. By utilising the widespread historical sources relevant to the study (widespread both in space and time) I hope to have provided a detailed, if not comprehensive, survey of the complex issues involved. Following McCormick's masterful overview of the Western European medieval economy *The Origins of the European Economy* (2001), it should be possible to identify wider trends and local detail within the early medieval economy of the Baltic Sea region. While this chapter ended with an investigation of the known commodities and cargoes of the period – the bullion found throughout the region; the historically-attested large scale and widespread trade in slaves; the importance of the fur trade on the 'northern arc' to supply expensive Islamic tastes; and high status weaponry and luxury goods – the following chapter details the commodities of trade within the regional system and asks whether standardisation, one of the best identifiers of regularised trade, can be identified.

Forms of wealth accumulation and trading standardisation in the early medieval period in the Baltic region

During the course of the early medieval period in the Western Slavonic lands of the southern Baltic coast, the development of the local and regional social elites acted as a stimulator to the growth of a number of branches of industry and trade and to increasing specialisation (Wyrozumski 1983, 248). The regional context and some of the actual commodities of this growth in trade and production have been discussed in the previous chapter. Apart from physical evidence of foreign materials in the archaeological record of any given region, it is standardisation in the material commodities and machinations of trade that are the best indicators of a widespread trading network in the early medieval period of the Baltic region. Over the course of the 9th century the craft production at the Baltic trading places became more standardised – the number of variations in comb types decreases for example (Callmer 1992, 140). However, the typological study of the goods of craft production – combs, beads and jewellery for example – does not form part of this study; it is sufficient to note that (as discussed in the previous chapter) evidence of such craft production has often be found alongside other, often less tangible, indicators of the development of trade and exchange at the coastal early towns of the Baltic. This chapter is intended to explore and discuss the archaeological and historical indicators of the development of metrological standardisation within trade and exchange.

Contemporary early medieval European historical sources describe many instances of standardisation within the products of the natural world (such as grain or salt), particularly in regularised amounts of tithe and taxes. However, such detail is hard to identify within the archaeological record. Despite this, such evidence of standardisation is visible within the archaeological record: iron was traded in regularised bars or ingots such as the Scandinavian *vaerjern* or Slavonic *grzywny*. Standardisation did occur within commodities exchanged or likely exchanged during the Baltic Viking Age. Further (although later) evidence of metrological trading standardisation may be seen in the furs used as currency in the trading centres of the 'northern arc' – the lead *plomby* and squirrel pelts

mentioned in the birch-bark documents from Novgorod probably indicate the use of furs as a standardised form of currency.

The main evidence for metrological trading standardisation within the Baltic Viking Age is, of course, the widespread use of common weight systems. Balances and standardised sets of weights are typical finds within an area using a weight-based monetary system. They were used in long-distance trade and, as a result, by everyone in associated markets or areas of transactions (Steuer 1997, 441). While weights and balances would have been used in other instances – the craftsman weighing his metals prior to alloying for example, or perhaps when setting the correct payment of fines and rewards – and it would be wrong to assign every occupant of a grave that contained weights the role of trader, it is the standardised nature of the system that promotes reflection. Further avenues of research (archaeological, historical and iconographical) into trading standardisation will thus also be explored, such as other forms of wealth accumulation (iron, honey, salt and furs, for example) and the standardisation or regularisation of pottery volumes and measurements of cloth. The basic premise of these discussions is that trade systemisation (rather than infrequent, opportunistic trade) prompted the centralisation of trade and the growth of trade standardisation. This sequence is difficult to identify in the archaeological and historical record. It is not, however, an unlikely scenario. With regularised trade, geographical centralisation occurred, visible in phenomena such as beach markets and early towns. These geographical centres appeared for a variety of reasons, such as proximity to a resource (such as Kołobrzeg, situated close to major salt pans) or foundation by an existing authority (such as Hedeby). Centralisation also occurred without the aid of trade (such as Trelleborg, a Viking fort). The centralisation of authority could be argued as the cause of many elements of trading standardisations (as authority sought control). However, trade standardisation is also a natural result of trade systemisation. The main factors within early medieval trade – systemisation, centralisation and standardisation – do not necessarily beget one another, although the systemisation of trade would certainly appear to precede standardisation.

The accumulation of wealth more often than not goes hand in hand with the accumulation of power. Trade is often the means by which powerful individuals or social elites accumulate the trappings of power, either directly (such as by obtaining luxury goods) or indirectly (such as controlling the supply of commodities in general demand 'at home' or 'abroad'). While the machinations of trade (or rather the traders themselves) may exist beyond the control of the individuals or social elites that they serve, the point is valid: trade (certainly large scale trade) rarely occurs outside the larger social structure of the accumulation of wealth and power (perhaps beach markets could be an example of long-distance trade occurring out with the immediate environs of social or authoritative control). Archaeologists and historians have long studied the economics of a culture or society as a means to develop understanding in regard to the social dynamics of the group concerned. One area of particular interest to both the archaeologist and the historian is the development and use of money, whether as coinage, bullion, ingot, tokens and notes; and of particular interest to this thesis is the development of various non-coinage monetary systems and systems of standardisation within trade. Weight units are often crucial within the development of units of bullion or ingots – and such measuring systems had social uses beyond simply setting the accepted bullion standard. Such systems often had great longevity and a wide geographical spread. The use of the Arabic mitqal in the weight systems of the Viking Age and early medieval period in the Baltic region (discussed in detail below) is one such instance of cultural transfer, mirrored in the spread of the weights used in ancient Mesopotamia, the shekel and the mina, which both become widespread in the Mediterranean world and were adopted by the Greeks in the early first millennium BC (Williams 1998, 22).

Indeed, such long distance contacts (and trade) in the Mediterranean presumably played a significant role in the development of the use of precious metal as money. While goods would have often been exchanged by barter, desired (and thus valuable) metals such as gold and silver would also have changed hands. They were valuable possessions in themselves and hence easily valued and exchanged against other goods. The fact that metals were not subject to short-term decay or to yearly fluctuation of supply (like grain) must have increased their usefulness for traders. Thus gold and silver, even in small amounts, could

constitute an effective means of making actual payments, whether of a commercial, legal or social kind, because of their general acceptation over a wide area (Williams 1998, 22).

Weights and weight systems

In 1910 an unusual discovery of seven small, simple gold rings was made in Rosland, Rogaland in southwest Norway. The seven rings had been hidden 'at the edge of a stone just below the heather' (Bakka 1979, 279). Analysis proved that the gold rings belonged together as a set of weights, corresponding to the Roman weight system and probably used for measuring coin or precious metal. Bakka considered the weights to be 4th century AD in date. The weights were comparable (in weight) to other weight sets found (usually in graves) throughout Merovingian western Europe.

Fig. 10. Spherical weights with flat poles (with imitation Arabic symbols) from Hemse, Gotland (left) and Birka (right) (after Steuer 1997, 296).

The earliest forms of widespread standardised weight found in north-eastern Europe (such as the spherical weight with flat poles) were introduced to alongside the first wave of Arabic silver at the beginning of the 9th century (Fig. 10). The associated weight systems have been the subject of much academic

inquiry (summarised below) and, I will argue, are simply the most visible evidence of the widespread acceptance of common mercantile ideas and practices. Similar methods of standardisation are visible in both the archaeological and historical records.

T.J. Arne (1914, 176-96) was the first to undertake a serious study of the Swedish weight system of the Viking Period. He concentrated in particular upon the system using the bronze-covered spherical weight. His results indicated that the weight systems originated from the Islamic world, although the poor conditions of the weights that he studied conspired to make his results uncertain. Despite this underlying problem, Arne was able to correctly identify the basic unit weight of the Arabic mitqal (or gold standard) in his assemblage: 4.25g (cf. the value of Hinz 1970, 4.233g) (Sperber 1996, 7). Kisch, writing in 1959, also explored the links between the weights found in Scandinavia, the Arabic coins within the archaeological record and 'Arabic influence' (1959, 160-68).

More recently, the Swedish weights of the early medieval period have been assessed by Kyhlberg (1980), Sperber (1996) and Gustin (2004). Sperber's study was based upon the study of the 150 weights recovered from the excavation of the harbour site at Bandlunde Bay on the eastern coast of Gotland – and also included the Swedish finds of balances. The Bandlunde weights are not typical of the finds of weights and weight sets found elsewhere in Sweden, as most weights held in Swedish museums have been found accidentally, usually as single finds from graves or settlement sites. Unfortunately, many of the Bandlunde spherical bronze-covered iron weights were badly corroded and new techniques had to be used to reconstruct or postulate the original weights of those that were not too badly damaged (Sperber 1996, 8). Despite this setback, Sperber was able to identify the weight systems that were in use in Sweden during the Viking Age and early medieval periods. Recent studies of Russian, German, Polish and British Viking Age weights include those by Pushkina (1997), Steuer (1997), Wachowski (1972) and Kruse (1988) respectively. Kruse has also compared the contemporary late Saxon weights and balances with the Scandinavian material (1992).

Methodological problem with the reconstruction of weights

Corrosion of the weights is the biggest problem that scholars of this subject must cope with and depends largely upon depositional factors, the type of weight concerned and the material from which it is made. Spherical bronze-covered iron weights suffer more than most, for the chemical factors between the bronze and the iron ensure its speedy decay. If two metals are in contact with one another in water or in dump air, there will be galvanic currents like a short-circulated battery. The less noble metal will be dissolved as ions in the solution, where it will probably be transformed into other corrosion products, thereby allowing more of the weaker metal to be dissolved and the gradual process of destruction to proceed. The spherical weights constitute such a system, the bronze being the noble metal and the iron the less noble and consequently the loser. If the bronze shell were free of the leaks the moisture would have no opportunity of reaching the iron core and the weight would behave as one of solid bronze. However this seems never to be the case. There are always small leaks, mostly at the edges of the polar surface (Sperber 1996, 28).

The distribution of weights

Weights of the Viking world range widely in shape form and weight. On the southern coasts of the Baltic Sea, in the Western Slavonic homelands, different types of weights co-existed in the same regions at the same time. The excavation of a 10th or 11th century merchant's grave from Sowinki gm. Mosina, woj. Wielkopolskie, Poland (grave number 70) revealed an assemblage of several different varieties of weight in one set (complete with a portable scale). Of the nineteen weights recovered, six were spherical and made of iron with bronze coating; twelve were of lead in a variety of shapes (spherical, disc-shaped, cone-shaped, globular, die-shaped and brick-shaped); and one was a stone of a particular weight – perhaps a replacement (Krzyszowski 1997, 645). Indeed, as Sperber notes, "the weights used during different periods in history vary a great deal. Only occasionally they may look like the weights we are accustomed to. In fact, a weight could assume almost any shape and it is highly

likely that many weights may have been overlooked or perhaps attributed to one of the classes of toys, beads or gaming pieces" (Sperber 1996, 26).

In the Baltic region, but mostly in the Scandinavian areas, the most common weights are either spherical with flat poles or polyhedral (or 'cubo-octahedral') in shape. Both types probably had Islamic prototypes (Sperber 1996, 61). These small spherical and polyhedral weights were probably used for weighing precious metals on small portable scales. Scales and weights dating from the 9th to the 11th centuries have been found at 45 sites in the territories of the Rus; many are spherical with flattened poles or polyhedral in shape (Pushkina 1997, 23).

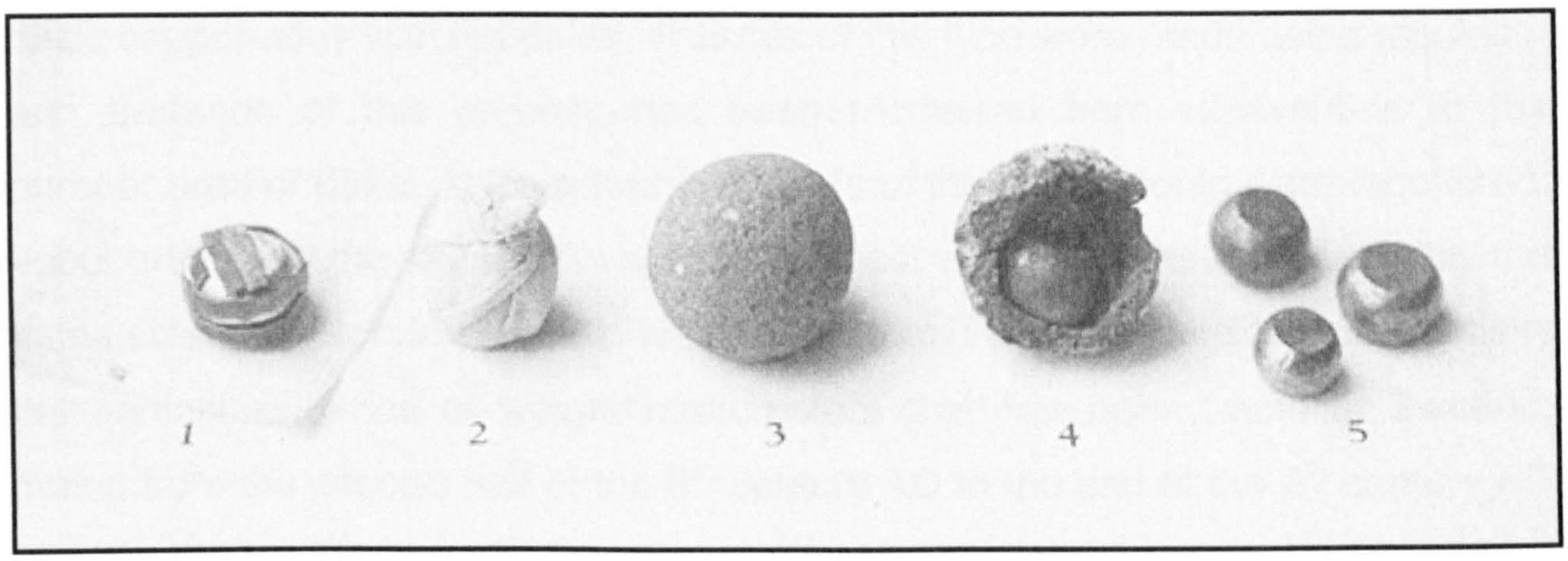

Fig. 11. A reconstruction of the process of making spherical bronze weights using 'Schmelzkugeln' (after Söderberg and Holmquist Olausson 1996, internet copy).

The excavation of the town rampart at Birka recovered fragments of a crucible used in the manufacture of iron-core spherical weights. This type of crucible has been named 'Schmelzkugeln' (Söderberg 1996, 7; Gustin 1997, 171). A small group of the crucible fragments were shaped (on their inner side) to suit a small spherical object with flat poles. There were also traces of a cloth bag, which had enclosed the spherical objects. Söderberg has described the process as one in which the crucible was used as a mould where copper filings (wrapped around the iron core of the weight and kept in place by the cloth bag) were melted to enclose the core (Fig. 11). Such 'Schmelzkugeln' have also been found at other sites, including Hedeby and Sigtuna. In contrast, fragments of 'Schmelzkugeln' have not yet been recovered from any Viking Age site that has no, or only

occasional, evidence of the use of spherical weights, such as Helgö, Ribe and Kaupang (Gustin 1997, 172).

Whether wholly copper-alloy or having an iron core, the spherical weights were smoothed and polished prior to the decoration of the surface of the flat poles using a punch. Whatever decoration was chosen, the regularity of the designs would seem to suggest that they functioned as recognised weight markings. These markings are described in more detail below.

The vast majority of Viking Age spherical weights consist of an iron core with a thin bronze coating. Occasionally, spherical weights were made of bronze or a basic copper-alloy with flat poles. Weights of this type were made using moulds – and evidence of this process has been recovered from excavations at the harbour area of Birka. At least four fragments of the same mould were recovered, enough to show the shape of a spherical object with flat poles – and roughly the same size as a bronze spherical weight also found during this excavation. This is the earliest evidence of weight manufacture that has been found in Sweden, dating from the second half of the 8th century AD to the end of the 9th century AD (Gustin 1997, 171).

The northwest of the expanded Viking world also commonly used many different shapes and types of weight. One recent analysis compared the lead coin weights from Anglo-Saxon England with those from the Viking Danelaw – and suggested that the form of the latter coin weights may have been directly influenced by contact with the former (Williams 1999, 34-36). This has interesting cultural implications when compared to the Baltic uptake of the Islamic weights and weight system (discussed below). One of the most varied assemblages of lead weight shapes comes from Dublin. Discs, bowls, hemispheres and cones of both plain and perforated varieties, as well as rings, hammer-finished lumps and lead-filled copper-alloy containers, were recovered. The basic unit of the majority of these weights from Dublin (26.6g) was close to the Roman and Carolingian ounces of 26.8g and 25.6g respectively. The surviving specimens were multiples or fractions of this unit, no matter what their shape (Wallace 1987, 212). There were also several spherical iron weights with a copper-alloy coating which, on the

basis of their individual weight (about 24g) and the technology of their manufacture, were probably imported (Wallace 1987, 212). There is, however, an absence of polyhedral weights from the assemblage. The Dublin excavations probably emphasise and underline Dublin's trade links with the ports of western England and the northwest Continental region: evidence of a relative degree of economic independence from the Scandinavian world of the North Atlantic even as early as the mid-10th century (Wallace 1987, 213). Both examples suggest that the Vikings would culturally accept the weights (and perhaps weight systems) of their opposites during any contact or exchange.

There have also been many forms of weight recovered from the Viking homelands. At the early Viking site at Ribe, Denmark, a large number of cylindrical weights have been recovered through excavation around a bronze workshop. Some of them are very small (weighing around 1g) and none are much heavier than the equivalent of about one Scandinavian öre (24.4g). It has been suggested that these small and simple weights from Ribe may have been used not only for weighing small quantities of precious metals (in trade) but also for weighing out base metals in the workshop (Owen 1999, 124-25).

The chronology of weights

Gustin, using work by Heiko Steuer (1987), has identified three phases of economic activity in the distribution areas of the different types of weight in northern and eastern Europe in the Viking Age (Gustin 1997, 169). The first phase began around AD 870/880 when a standardised weight system was introduced in many areas. In north western Carolingian Europe a coin-based system of exchange was operating (the silver *sceatta* and *denier* discussed previously), but in the areas of Viking influence the standardised weight system developed into two main zones of exchange. The North Sea area is characterized by large number of different types of lead weights. The Baltic, in contrast, has standardized weight sets with spherical weights with flat poles and polyhedral weights.

The second phase begins around AD 970-1000. The influx of Arabic silver ceases and weights and balances begin to show new formal elements. The North Sea zone now uses many coins from northwest Europe, although still predominantly as hack-silver. Trade and exchange between the two areas was probably much more common. The Baltic area now includes all the areas round the eastern and south coast of the Baltic Sea, along with parts of the interior Slavonic areas and northern Norway. The island of Gotland appears to be the core area in the distribution of weights and balances.

The third phase begins abound AD 1050/1075 and once again brings new formal elements in the design of weights and balances. In the North Sea area the varied weight-based economy has given way to a coin-based economy. In the eastern area certain economic regions are clearly distinguishable, such as Sweden, the Baltic region and the Western Slavonic area, which has been extended to the south. Gotland is still the core area for spherical weights.

The spherical weight was introduced no earlier than AD 870/880. In the Viking homelands a small number of solid copper-alloy spherical weights have been found and most, although not all, are of a later date than the end of the 9th century (Sperber 1996, 93). The solid copper-alloy spherical weights from Birka, Sweden and probably also from Bandlunde, Gotland, are, however, earlier than c. AD 970. Those from Södra Byrummet, Visby (Gotland) are later. Generally, the solid weights occurred both before and after the second half of the 10th century, during the decades when the supply of Islamic silver coins to Sweden began to wane (Sperber 1996, 93). At Sigtuna, the main concentrations of the 'Schmelzkugeln' type of crucible have been found in the quarters of Urmakaren 1 and Humlegården and have been dated to the start of the 11th century (Gustin 1997, 171). The two quarters are located near what was probably the royal demesne. The impression of a die for a coin of Olaf Skötkonung was also recovered from these quarters. Söderberg (1996, 34) established that the total weight of all the 'Schmelzkugeln' crucible fragments recovered amounted to over 7kg. This would in turn indicate that over 250 whole crucibles were represented in the assemblage of fragments. The large quantity of fragments indicates that there was extensive production of bronze-covered iron spherical weights at

Sigtuna – and in the same place where the first Scandinavian coins were minted (Gustin 1997, 172). The control and production of the weights may have been deemed as important as the control and production of the royal mint.

Sperber has suggested (1996, 93) that a manufacturing site producing spherical weights of solid bronze/copper-alloy started in the 9th century and continued to manufacture weights for some time after the overall production of the later and more numerous bronze-coated iron spherical weights had dwindled in the late 10th century.

Weight systems

Both polyhedral and spherical weights with flat poles appear to have been used across a large geographical area. They have been found at Viking Age trading sites and in graves throughout the Baltic area and in Russia (for examples see Steuer 1987; Gustin 1997; Łosinski 1997; and Jansson 1987). The actual individual weight of these spherical weights varies. The lightest weighs 0.442g and was recovered from Birka, Sweden (nr.135/1: Sperber 1996, 81); and the heaviest weighs 162.8g and was recovered from Bandlunde, Gotland (nr.108 Sperber 1996, 68). The largest number of weights has been found in Sweden. Sperber examined the majority of the Swedish weights and concluded that there were at least three parallel Viking Age weight systems in use on the Swedish mainland and Gotland (Sperber 1996).

The two systems with the greatest representation were based on the Islamic weight unit for gold, the *mitqal*, a coin weight established to be 4.233g (Hinz 1970). The Islamic system was defined by the Caliph Abd al-Malik in the year AD 696/697. It was a dual system intended to be used for both silver and gold without elaborate conversion of the weight figures, provided that gold was exactly 14 times more expensive than silver. Its sub-unit, the dirham, was set at 0.7 mitqals. Unfortunately, however, the gold and silver prices changed and so did their relative value. The factor 0.7 became irrelevant and the simpler factor of two-thirds replaced it. The standard mitqal remained unchanged, but the dirham fluctuated by as much as 5% from 2.96g to 2.82g (Sperber 1996, 54).

The two main weight systems in use in Viking Age Scandinavia can be summarised as follows: the Islamic trade system, based on the market dirham (two-thirds of a mitqal = 2.822g); and the Swedish/Islamic system, based on the three-mitqal unit (12.7g). The original legal dirham defined by the Caliph Abd al-Malik (0.7 of a mitqal) does not appear to have been in use. The actual weight sets used by merchants and traders were fractions based on these systems. The Islamic trade system divided the 12.7g unit weight into 3 mitqals, with each mitqal being 1.5 dirhams. The dirham was then divided into quarters and eighths. The Swedish/Islamic system divided the 12.7g or three mitqal unit weight by 2, 4, 8 or 16 to obtain smaller weights. The sixteenth-part weight (0.8g) may have been a kind of standard weight, for its multiples of 2 (1.6g) and 3 (2.4g) are common sizes in the Swedish material (Sperber 1996, 54-55).

Weight markings

Most weights were simply decorated, with weight markings in the form of dots or circles. The circles often had a small central hole (e.g. that from Cleat, Orkney (Maleszka 2003) or Birka, Sweden, SHM 5208/217, (Sperber 1996)) and were sometimes grouped in pairs (e.g. Klenz, Kr. Güstrow, Germany ALM 1994/991/2-3 (Lüth and Schoknecht 1995, 327)). The central decoration of the poles were also sometimes linked by curved lines. Some weights were decorated with a dotted stamp all around the edges of the poles, creating a form of single (and sometimes double) linear decoration around the circumference of the pole. Occasionally, some spherical weights also had an S-shaped decoration punched into the surface of pole (e.g. Ciepłe St.6 woj. Pomorskie, Poland (Żak 1957, 166; Kara 1998, 509)). The most elaborate decorations on the spherical weights are pseudo-Islamic ornamentations (e.g. Nysätra, Uppland, UMF 3442; Kopparsvik, Gotland, F7 and F8 (Sperber 1996, 98)).

The great majority of weights from the Islamic world were made from glass and were inscribed. According to Arabic historical tradition, the Umayyad Caliph Abd al-Malik (ruled AD 685-705) recommended the issuing of glass weights for the purpose of testing coins, the idea being that the glass would not be 'susceptible

to alteration either by augmentation or by diminution' in that any tampering would be easily detected (Miles 1948, 2-3). There are three main types of early glass 'coin' weights: the *dinar* (gold), *dirham* (silver) and *fals* (copper). These weights were both shaped like coins and were used for the testing of the relevant coins. Examples of some of the inscriptions (including the names of the governors who authorised them) include:

In the name of Allah:
ordered 'Ubaydullah
Ibn al-Habhab:
weight of fals
of twenty qirat.

Example number 12; dating from AD 720-734 (Miles 1948, 75).

[In the name of A]llah: com-
[manded Allah] honesty;
[ordered 'I]sa bin abi-
['Ata] the stamping of it,
[wei]ght of dinar, at
[the hand]s of Yazid bin (?)
[abi-Yazid ?].

Example number 39; broken, with about two-fifths missing; dating from AD 745-749 (Miles 1948, 89).

In the name of Allah:
ordered the Amir
Yazid bin Hatim:
weight of dinar,
(full weight).

Example number 77; dating from AD 762-769 (Miles 1948, 113).

Laws ensured that these glass weights were kept in good order and officials were employed to inspect them in the market place (Kmietowicz 1958, 10-11). The majority of the decorated weights from the early medieval Baltic region are decorated with simple punched dots and symmetrical markings. Kyhlberg states that the decorations on the weights usually mark the number of the weights in a particular set and identify that set, rather than mark their absolute value within the system (Sperber 1996, 66). However, in several cases, these can be argued to represent and correspond to the actual weight of the weight concerned (Maleszka 2003).

The well-preserved weight from Cleat, Orkney corresponds with the Islamic trade system. It has five circles (each with small central hole) marked on each side. Its weight, 7.1g, can be divided by the five marks on one side to reach 1.42g and by all ten marks to reach 0.71g. The Islamic trade system divided the market dirham (2.822g) into halves (1.41g) quarters (0.705g) and eighths. The weight divisions that can be obtained from the Cleat weight are sufficiently close to the definitive fractions of the Islamic trade system that it may be described as belonging to the Islamic trade system. The Cleat weight corresponds to two and a half market dirhams (Maleszka 2003).

The example from Cleat, Orkney supports the argument that the markings on the spherical weights correspond to their actual weight – and its position within the system. A further example of a spherical weight whose markings correspond to its actual weight is one from Września, Poland (Maleszka 1998, 180); this bronze-covered iron weight weighed 12.69g after conservation and had two dots on one pole and a single dot on the reverse, corresponding to the division of the unit weight of 12.7g into three mitqals. Perhaps the concept of weight markings was also adopted from the Islamic world alongside the Islamic weight system.

Balances

Of course, the key to the accuracy of weights and weight-sets is the balance. No weight can be more accurate than is allowed by the balance that is used, so to study only the weights would give a false picture of the accuracy achievable by

early merchants and craftsmen (although some unscrupulous merchants may not have desired perfectly accurate weights or balances).

The most common type of balance is the two-armed balance. Essentially, it has remained unchanged in its construction for several thousand of years. The theory of the two-armed balance allows the sensitivity of such balances to be calculated from data easily obtained from an intact example. Several examples are known from the Baltic Viking Age. These are all of the same type, different only in details and decoration. They have been studied in some detail, especially with regard to their sensitivity. With relatively low loads, a deviation of the balance of 0.1g results in a defection of the pointer tip of about 0.3mm. It is thought that, for a hand-held scale, a deflection of up to 1mm would satisfy the trading partners – and thus the accuracy of the balances in daily use would easily catch a discrepancy of a gram or more (Sperber 1996, 108). It should be remembered that these scales are small, portable silver-weighing scales; for the weighing of everyday commodities, larger scales would have been employed. Some have inscriptions: one example, from Mezares in Latvia has the Arabic inscription '*bakarat*' (meaning [Allah's] 'blessing') on both pans (Steuer 1997, 6); another, from a Scandinavian grave in Timerevo on the upper Volga, has an Arabic inscription meaning 'tax' or 'toll' on both pans (Stalsberg 1991, 76).

The steelyard (a kind of balance with a short arm to take the item to be weighed and a long graduated arm along which a weight is moved until it balances) would have been used for weighing larger amounts. A wooden steelyard has been recovered from Novgorod (dated to the 11th century) and an iron steelyard has been recovered from Stara Riazan (and dated to the 12th century). However, the steelyard must have been in widespread use from an earlier date, as archaeologically recovered weights have a wide distribution, both chronologically and in geographical spread. An example of this type of weight is the lead weight (of 910g) from Styrmen, Bulgaria (dated to the 10th century) (Hensel 1987, 637-39).

Other forms of wealth accumulation or standardisation in the archaeological and historical record

Turning from precious metals, slaves and furs as commodities (previously discussed), there are several other forms of wealth accumulation visible in the archaeological and historical record; most have evidence of standardisation with implications for trade over a wide area. Iron bars and tokens have been found in large quantities as hoarded material in their own right. There is much historical evidence and assorted archaeological evidence. Of course, the very act of trade and exchange can lead to a standardisation of sorts: the systematic (and often centralised) production or accumulation of any given commodity can give rise to natural standardisation. This phenomena must be bourn in mind during the following discussions – are the standardisations highlighted the result of a conscious drive for uniform measurements, or simply the result of functional circumstance? Standardisation is not simply an indicator of the economic factors of increased production or craft specialisation – it can result from other factors which may be technical, social or political. Technical factors may be both intentional strategy or unintentional circumstance – while social factors include functional requirements and aesthetic considerations. Even when standardisation is deliberately sought, limitations on human visual perception, motor skills and memory ensure that a production process (without reference to an independent control) is unlikely to achieve a greater degree of standardisation than within c. 5% (Berg 2004, 75).

That there are other media for the exchange of goods and services in non-monetary economies is reflected in anthropological studies which reveal items like shells, slabs of salt, metal bars or axeheads all functioning as mutually agreed 'money'. Such objects can be used as practical means of payment and exchange within a limited geographical area or between certain groups within society. This *special-purpose money* must not be confused with modern *all-purpose money*, which contains all the generally defined functions of money: as a means of payment, means of exchange, standard of value and value guarantor. Special purpose money may have only one or some of these functions but, on the other hand, has not only economic but also social, political or religious

functions. Some concepts for such special-purpose money were introduced by the anthropologist George Dalton. Alongside *primitive money*, which functions as a commercial medium in exchange, he also defined media with other characteristics and with other specific functions as early cash or primitive valuables (Gaimster 1991, 116).

Dalton's concept of early 'cash' stresses the controlled and limited functions of early coinage; it explicitly refers to the growth of states and the appearance of money that is both uniform and controlled, for example by a king or bishop. Its main function is more as a means of payment for particular forms of social dependencies such as taxes or fines or in state administration, as in the case of military finances, than as a practical means of exchange. This can be shown for much of the Byzantine coinage which mainly circulated between the state, the military and the supporting landowners. A similar lack of correlation to open trade has been recognised in the earliest Greek coinage (Gaimster 1991, 116). However, in the Viking Age, such forms of early 'cash' certainly included functional market uses. These include the Drohiczyn *plomby* (discussed later) and Prague linen cloths (also discussed later). These other forms of media that display wealth accumulation and types of standardised exchange include amber, iron and several products of the rural economy.

Iron

Iron currency bars and, presumably, iron rods and other iron products without any functional features form a separate category within currency of a non-coinage character. In western Europe in the 8th and 9th centuries, iron was used as a payment in taxes and tributes; there is historical evidence from St. Gallen, Switzerland, that such payments could be made in iron. One gold *solidi* (a coin weighing 4.5g) was worth 70 pounds of iron (Dzieduszycki 1995, 104).

Fig. 12. *Vaerjern* from Denmark (after Margeson 1998, 27).

Iron as a category of currency is well known from Scandinavia from the 5th to the 10th centuries in the shape of tool-like objects (such as hammers, axes or scythes): so called *vaerjern* (Leciejewicz 1979, 48). The find of twelve unfinished iron axes from Denmark, hanging on a staff made from Spruce wood, could be used as an example of these *vaerjern* (Fig. 12). Spruce did not grow in Denmark, so the axes are likely to have come from Norway or Sweden (Margeson 1998, 27).

Fig. 13. *Grzywny* from a 9th century hoard from Axtbarren, Nitra in Slovakia (Moravia) (after Bialeková 2000, 202).

Slavonic comparisons for the Scandinavian vaerjern are the iron flat axe-like *grzywny*; and the 'Silesian bowls' from the southern Western Slavonic region. The *grzywny* begin to appear in the archaeological record from the 9th century (Fig. 13) and have a distribution around the Carpathian Mountains, in Moravia and the Małopolska regions (centred on modern Warsaw). The most impressive find of this kind was discovered in 1979 in Kraków (ul. Kanoniczna 13),

Similar items have been recognised in both ethnographical studies and historical documentation. In Central America, early Spanish settlers of the 16th century, mention the use of small axe-like copper objects by the local people as a means of currency (Williams 1998, 200-201). Similar behaviour was seen in the 20th century in Liberia, where iron *Kissi* pennies were in use. These iron rods were used as currency. The shape is thought to indicate the quality of the iron used: half the rod is hammered and half is twisted, while one end is drawn to a point and the other is sharpened to a blade. If the iron could be worked in these four ways it was shown to be of good quality (Williams 1998, 214).

Brass bars also seem to have been traded during the Viking Age, having been found at most of the early towns around the Baltic (including Birka, Ribe, Hedeby, Wolin, Staraja Ladoga, Paviken and Starigard/Oldenburg). Larger hoards have been found at Myrvälde and Kamänget on Gotland and from the harbour at Hedeby – and there are certainly elements of standardisation visible within (but not yet between) the hoards. It is likely that the provenance of the brass bars within the Baltic is the Rhineland (Sindbæk 2003, 49-60).

Excluding the metrological trading standardisation employed by the weights and weights systems in use, the main evidence for standardisation visible within the archaeological record of the Baltic Viking Age is the iron traded in regularised bars or ingots such as the Scandinavian *vaerjern* or Slavonic *grzywny*.

Products of a rural economy and the exploitation of the natural world

Of course, alongside the products of craftsmanship, such as weapons and jewellery, the products of the rural economy and the exploitation of the natural world (such as timber and salt) of those peoples around the Baltic Sea in the early medieval period must be included in those commodities exchanged in trade. What forms of trading standardisation can be seen in such items in the archaeological and historical record? Payment of taxes and tribute must have often been in kind, but were these valued in set amounts? Goods such as grain, salt and honey may have been traded in quantities, but were these recognised and standardised quantities?

The historical sources illustrate many examples of standardisation. A Frankish tax was levied between the years AD 903 – 906 on the area of the March of Austria; this tax could be paid in coin or specific amounts of bees wax or salt (*Codex diplomaticus et epistolaris regni Bohemiae*) (Labuda 1999, 116-17). The *Traditiones et antiquitates Fuldenses* describes a tribute paid by Polabian Slavs to the Monastery in Fulda in 8th and 9th centuries; the tribute is broken down into many products of specified amounts (Labuda 1999, 114-16). Helmold, a cleric from Bosau (*Helmoldi, presbyteri Bozoviensis*), wrote the late 12th century *Cronica Slavorum*. This described the history of the Obodrites and documented the tribute they paid to their bishops. Helmold noted differences between measurements of cereals and also linen (Labuda 1999, 130-31). From the 10th century, medieval Poland used one measurement for tributes or taxes that was to be paid in grain. This measurement was based on the *mensura Sancti Adalberti*. This type of measurement may also have been used to measure different dry products (such as fruit) and also honey. In addition, from the 13th century in the Pomeranian region, traders with the Hanseatic cites used a special vessel for liquids called *vas Slavonica* (Giliewicz 1967, 206-207).

Another type of historical source (one where archaeology has played a key role in uncovering) are the birch-bark documents from Novgorod, which include information about politics, society, domestic economy, trade, ideology and everyday life for the occupants of the medieval town and its hinterland from the late 11th to the 15th centuries. They contain important information about the types of cereal eaten (such as barley, rye, wheat and oats), foodstuffs available (such as bread, meat, butter, cheese, sausage, salt, honey, vinegar and fish), as well as wild animals exploited (in particular for fur, such as the squirrel, beaver, marten, arctic fox, fox, otter, sable, seal, wolverine and hare) and domestic animals kept (such as horse, cattle, goat and hound) and birds used (falcon and gyrfalcon) (Rybina 2001, 127). Analysis of these birch-bark documents has shown that in the majority of cases all these categories are also referred to in terms of tribute collection. It is clear that ordinary products were collected, alongside such traditional documented articles of taxation such as grain and furs

– which are also often mentioned in the birch-bark documents (Rybina 2001, 127).

Honey

Honey is mentioned five times in the birch-bark documents from Novgorod, mostly as tribute or discussed as trade items. The documents that mention honey are dated to as early as the late 11th or early 12th centuries (Rybina 2001, 128). Honey is also mentioned as a tax or custom duty (listed as "two measurements") in the *Codex diplomaticus et epistolaris regni Bohemiae*, a list compiled for the Frankish King Louis the Child in AD 903-6 of tributes or custom duties to be paid in the Eastern Marches of the East Frankish Kingdom (Labuda 1999, 116-17).

Many Islamic traveller's reports and geographies from the 9th to the 11th centuries refer to the prosperous production of honey and wax in the steppes and in the land beyond them. Both Al-Istahri and Ibn Hawqal relate that honey and wax were imported by the Khazars from the lands of the Volga Bulgars and the Rus – and were then traded southwards (Nazmin 1998, 204).

The revenues of the Abbāsid caliphate at the beginning of the 9th century AD, referring to the reign of the Caliph Harun al-Rashid (r. AD 786 – 809), were detailed in a list by Al-Ğahšiyārī (Nazmin 1998, 253-56). This list details tributes from various regions, sometimes in coin and sometimes goods in kind or a mixture of both. We can assume that some of the goods in kind were acquired from external sources; what is particularly interesting is the sheer scale of the international trade and the variety of commodities on offer. One of the tributes from Isfahān (a city and region in central Iran 'except Hamtis and the rasātiq of Radis') was listed as honey (in *raṭls*, an Islamic weight measure equivalent to about 90 *mitqals*) worth 20,000 dirhams and wax (also in *raṭls*) also worth 20,000 dirhams. In addition, one of the tributes from Hamadān (a small region in northern Iran) was listed as white honey (again in *raṭls*) worth 20,000 dirhams; and one of the smaller tributes from Ğīlān (a small region on the Caspian Sea) was listed as honey (in 'skins') worth 12 dirhams (Nazmin 1998, 253-56).

The present day Swedish term for drinking honey, mjöd – and indeed the English word mead – may have its roots in the Slavonic name for drinking honey, mód. Ibn Rusta described the Slavs as a people who "*had no viticulture but possessed plenty of honey from which they prepared wine and the like*" (translation after Nazmin 1998, 204). Mead was likely to be important to both the Slavs and the Vikings. Ibn Fadlān notes the account by the Caliphal embassy from Baghdad to the King of the Volga Bulgars in the early 10th century AD. This describes the custom of Rus: "*the moment their boats reach this dock every one of them disembarks, carrying bread, meat, onions, milk and nabīdh* [alcohol]" (translation after Montgomery 2000, 9). Montgomery suggests that *nabīdh* refers to mead and not beer as is widely supposed. Indeed, the Russian *Chronicle* states that Vladimir considered the religion of Islam, but rejected it, claiming that "*drinking is the joy of the Rus and we cannot live without this pleasure*" (translation after Montgomery 2000, 14). Ibn Fadlān describes the funeral of a rich man thus: "*they gather together his possessions and divide them into three, one third for his family, one third to use for* [his funeral] *garments and one third with which they purchase alcohol which they drink on the day when his slave-girl kills herself and is cremated together with her master. They are addicted to alcohol, which they drink night and day. Sometimes one of them dies with the cup still in his hands*" (translation by Montgomery 2000, 14). Knowing the Viking drinking habits, we can presume substantial mead consumption – it is quite possible that such alcohol was precisely measured before sale.

Although there is no archaeological evidence for standardised units of honey or mead being traded in the Baltic Viking Age, it is possible that the widespread distribution of Slavonic pottery found around the Baltic region may indicate containers used within a trade in such foodstuffs.

Salt

Salt is mentioned as a tax or custom duty (listed as three *korczyki* – a historically documented measurement used only for salt) in the *Codex diplomaticus et epistolaris regni Bohemiae* (Labuda 1999, 116-17). Salt is mentioned in ten of the birch-bark documents from Novgorod, again mostly as tribute or discussed as

trade items. The documents that mention salt are dated to as early as the late 11th or early 12th centuries (Rybina 2001, 128). Indeed, the birch-bark documents from Novgorod occasionally refer to specific varieties of processed fish: dried fish (*sush*) (nr. 456), mildly salted fish (*prosol*) (nr. 280) and strongly salted fish (*posol*) (nr. 682) (Rybina 2001, 129). The processes would all suggest that there was also a big market for salt. The settlement of Kołobrzeg in Pomerania was founded on the back of local salt production. Historical references attest to the importance of this salt production – and the archaeological excavations of the town and its saltpans have confirmed this. *Thietmar's Chronicle*, an early 11th century text recording the history of the Frankish court of Otto III, mentions ecclesiastical matters concerning *Salsa Cholbergiensis* (a translation of the Polish 'Solec kolo brzegu' or 'Salt near the shore') – an indication of the importance of both the early town (the ecclesiastical matters concerned the organisation of the early Polish church in Kołobrzeg, Cracow and Wroclaw) and its connection with salt production (Leciejewicz 1997, 133). Salt was also mined in the region around Krakow from at least the 13th century. There is evidence from Kołobrzeg that a trade in salted herring was an important element of the local economy (at least in the 11th and 12th centuries AD), the fish being exported inland to Greater Poland and Silesia (Leciejewicz 1997, 135).

There are many historical references to the use of salt as a form of currency. The revenues of the Abbāsid Caliphate at the beginning of the 9th century AD, referring to the reign of the Caliph Harun al-Rashid (r. AD 786 – 809), were detailed in a list by Al-Ğahšiyārī (Nazmin 1998, 253-56). One of the tributes from Armenia was listed as salt (in *raṭls*, an Islamic weight measure) worth 10,000 dirhams.

An early Portuguese traveller, the missionary Francis Alvarez, who was sent as a royal emissary to Ethiopia (Abyssinia) from 1520 to 1526, mentions in his account of his journey the local practice of using salt to make payments, recording that "*salt is current instead of money from the Red Sea to Congo on the West Sea. It is said to be cut out of mountains and cut into blocks a hand and a half in length, four fingers broad and three fingers thick*" (translation after Williams 1998, 196). Interestingly, this custom had not changed by the 18th

century, when the British merchant Alexander Hamilton also encountered the use of salt in Ethiopia, noting that "*the current small money of Ethiopia is salt, which is dug out of the mountain as we do stones from our quarries...*" The salt bars were cut from rock salt into a specific size and wrapped in reed to protect it during use (Williams 1998, 196).

Marco Polo (*The travels of Marco Polo*), during his 13th century voyage to China, recorded that, in the Sichuan Province in western China, salt was used as a form of currency. He wrote that the Chinese "*have gold in bars and weight it out by saggi; and it is valued according to its weight. But they have no coined money bearing a stamp. For small change... they have salt... forming blocks of the size of a two penny loaf, flat below and rounded on top... On these blocks they set the Great Khan's stamp and currency of this sort is made only by his agents. Eighty of these blocks are worth a saggio of gold*" (Williams 1998, 197).

Although there is no archaeological evidence for standardised units of salt being traded in the Baltic Viking Age, it is possible that the widespread distribution of Slavonic pottery found around the Baltic region may indicate containers used in such a trade.

Grain

At this time the major crop grown in Scandinavia was barley – significantly different from the rest of Europe, which was also producing rye. However, archaeological evidence from many Scandinavian settlements of the 9th to 10th centuries indicates an increasing presence of rye cereal. Comparing samples from different excavated houses in Aarhus, it can be shown that there were stores/supplies of both barley and rye. The evidence from the early ring fort of Fyrkat in Denmark (where over seventy thousand rye seeds have been recovered) is also convincing. Some of the seeds of weed species that were also found would seem to indicate that the grain could have originated from either central or eastern Europe or from northeast Asia. This could suggest that the grain was imported from the lands of Slavonic neighbours on the southwest Baltic coast, and not, as has been suggested, from the Russian East

(Leciejewicz 1979, 130 and 177). The Jewish traveller Ibrahim ibn Yaqub, writing in the 10th century, described the western Slavonic lands as being very rich in food. He noted that the Slavs sowed twice a year, harvesting twice also (Labuda 1999, 123). This must have been an agricultural practice unusual enough to mention. Indeed, between AD 500 and AD 1000, pollen analyses have shown that the ratio of grass to cereal pollens in central and eastern Europe changed from around 3:1 to about 1:1 (Heather 1994, 54). The land under arable cultivation seems to have expanded greatly (at the expense of the land used for grassland pasture) under the tenure of the Slavs – and the planting of rye (a winter grain also indicated by the pollen evidence) would have allowed for a more productive three-field system of one field spring grain, the second field winter grain and the third field fallow (Heather 1994, 54).

It is noteworthy that cereal names in the Novgorod birch-bark documents are not found before the 12th century; however, there is no doubt that they were cultivated and consumed in the Novgorod region much earlier. Because cereals mainly appear in the birch-bark letters as a trade item (and later also as a tribute), the mentions may indicate the beginning of an organised cereal trade and the imposition of tributes. This would correspond well with the chronology for the establishment of the system of inherited patrimonial estates in the Novgorod territory (Rybina 2001, 128). This could be further indication that the rye imported into Scandinavia in earlier centuries came from the southwest Baltic coast rather than the Russian East.

Fig. 15. The residence of a Frankish noble in the 9th century, illustrated in the Utrecht Psalter. The distribution of food to the poor is blessed by God; corn appears to be measured into sacks (centre foreground) (after Poly 1997, 26).

Cloth sacks were certainly used in the early medieval period for the transportation (and perhaps storage) of cereal. In Gdańsk, Poland, excavation of early medieval layers in 1948 recovered the remains of a large woollen sack in which was found grains of wheat. Similar sacks have been recovered from excavations of Rus towns and settlements, such as one from Wszczyz, Russia, which was found next to a rotary quern (Hensel 1987, 72-75). Similar cereal sacks have been recognised in iconographical and bas-relief representations (Fig. 15). While it is not as yet possible from the archaeological or iconographic evidence to identify standardisation in the size of such sacks, there are several historical sources that mention specific set quantities of grain. Polabian Slavs paid tribute to the monastery of Fulda, Germany, in the 8th and 9th centuries (*Traditiones et antiquitates Fuldenses*) in many different products, often listed in specific measurements – one of which was cereals (Labuda 1999, 114-16).

Cattle

Cattle was frequently the actual medium of exchange in the early medieval period and, although cattle, skins and hides cannot be considered as artificially standardised goods, historical sources often record tributes and taxes being paid in cattle (Lewicki 1953b, 448-49). In early Germanic legal texts there are frequent references to cattle, in terms of which fines were often fixed. In the *Lex Ribuaria*, the *Lex Salica* and the *Capitulare Saxonicum* the wergild (a payment to the wronged family in cases of murder) was fixed both in coined money and in cattle (Einzig 1951, 265).

Furs as currency

The 'northern arc' supplied the Islamic world with the furs that they desired, the Scandinavian traders playing the role of middlemen between the Slavonic hunters and trappers that were spread over the forests of the north and the Muslim merchants who met them at towns such as Bulgar on the Volga river. The fur trade played a significant role in the influx of Arabic silver into the Baltic Sea region. Indeed, Arabic historical sources often noted that the Rus merchants travelled from the most distant parts of the land of the *Saqāliba* (the Slavonic lands) in order to participate in the fur trade (Nazmi 1998, 202) – and that the Bulgars and Khazars used to collect furs in tax from their subjugated people (Nazmi 1998, 199). It seems that the fur trade so greatly contributed to the economy of the Volga Bulgars that marten furs played the role of currency. Similarly, the Russian Primary Chronicle, a history of the Rus compiled in Kiev in AD 1113, records for the year AD 883 that the Drewlanie (an Eastern Slavonic tribe) paid their tribute to the Oleg of Kiev (a Rus prince) in black marten pelts. The Flemish Franciscan missionary and explorer William of Rubuck crossed Russia on his visit to Mongolia as the ambassador of Luis IX of France in AD 1253. His geographical report is considered to be very reliable – and he remarked that among the Russians the money in circulation consisted of small pieces of furs "marquetées de couleur" (Einzig 1951, 278).

According to Ibn Rusta, an Arabic geographer writing between the years AD 903-913, furs were the main wealth of the Volga Bulgars and that they used them instead of money. Ibn Rusta was using an original anonymous Arab report on the countries of Central Asia and Eastern Europe, a document dating from the second half of the 9th century (the original of which is unfortunately lost). The first transmitted version of the 9th century report is contained in the *Kitāb al-a'lāq an-nafīsa* by Ibn Rusta: "*they do not have* [metal] *money. They use dalaq* [marten pelts]. *Every single dalaq is equal to two and a half dirhams. Round white* [Silver] *dirhams are brought to them from the Muslim countries as exchange for their commodities*" (translation after Lewicki 1977, 33). The same source was used by Al-Gardīzī: "*the majority of their* [referring to the Bulgars] *property are dala. They do not have metal money. Instead of silver they have dala pelts, one for two dirhams. White* [silver] *and round dirhams they bring from Muslim countries. They break these dirhams and every piece...* [*text unclear*] (translation after Lewicki 1977, 33). Marten pelts were clearly being used as a coin substitute. Interestingly, in later medieval periods in Russia a small silver coin was named the *kuna*. The word *kuna*, which was also used to express money in general, originated from the skin of the marten (*kunitza*). Marten skins were a monetary unit in Russia till the late Middle Ages and it was not until AD 1411 that the *kuna* standard was abolished in Novgorod. During an early phase of the use of this money, skins had to be complete with snouts and paws; if claws were missing they were considered invalid (Einzig 1951, 278-79).

Abū Hāmid, an Arabic traveller and merchant, twice visited the homelands of the eastern Slavs in AD 1150 and 1153. During his reports from the Bulgar region, in the *al-Mu'rib 'an ba'd 'ağā'ib al-Maghrib*, he describes the role of furs as currency: "*legal tender for them* [the inhabitants of the *bilād as-Saqāliba*, or the Rus] *are the old furs of squirrels, which are without bristles* [or hairs] *and nobody needs them and they do not have any use. The value of eighteen of this type of pelt is equal, by their calculations, of one silver dirham. They tie them* [the pelts] *together into bundles, which are named ğ.q.n. For every single one of these pelts you may buy in this place one loaf of excellent bread, which will last for one strong man* [for one day]. *With* [these] *pelts they can buy all the commodities they need. If these pelts were found in any different country, you would not be*

able to buy even for one thousand [pelts] *one grain* [of corn] *and they would not be of any use. When they remove the bristles from these pelts in their houses, they… carry them to the market. In this place they have an honest man* [an official] *with workers…* [who] *sew together every eighteen pelts with a strong thread into one bundle.* [They] *fasten onto the end of the thread a fragment of black lead – on which he* [the official] *impresses the king's effigy. And then they stamp pelt after pelt until the moment that all of them have the stamp. Then it is not possible that anyone could reject these marked pelts* [as payment] *during buying or selling*'' (translation after Lewicki 1956a, 296).

Fig. 16. Carved relief panels from a pew-stall dedicated to the Novgorod Trading Company of Straslund in the Church of St. Nicholas, Stralsund (after Brisbane and Gaimster 2001).

There are some iconographical illustrations that could shed light upon how such pelts may have looked like. Carved relief panels from a pew-stall dedicated to the Novgorod Trading Company of Straslund in the Church of St. Nicholas, Stralsund, on the lower Pomeranian coast of northern Germany, provides a detailed visual record of the degree of western dependence on the Novgorod trade during the medieval period (Fig. 16). The painted wooden relief panels were carved in north Germany around AD 1400. They depict local Russians – identified by their long beards – collecting pelts, honey and pine resin in a dense forest landscape and delivering their harvest to Hanseatic German traders standing outside their fortified enclave within the city of Novgorod (Gaimster 2001, 67). Furs were prized for their thickness, warmth and status while the bulk

supplies of pine resin were particularly valuable to the shipbuilding industry, which distilled the raw material into pitch for the caulking of ships (Gaimster 2001, 67-68). The pelts are bound in the form of the bundle described by Abū Hāmid.

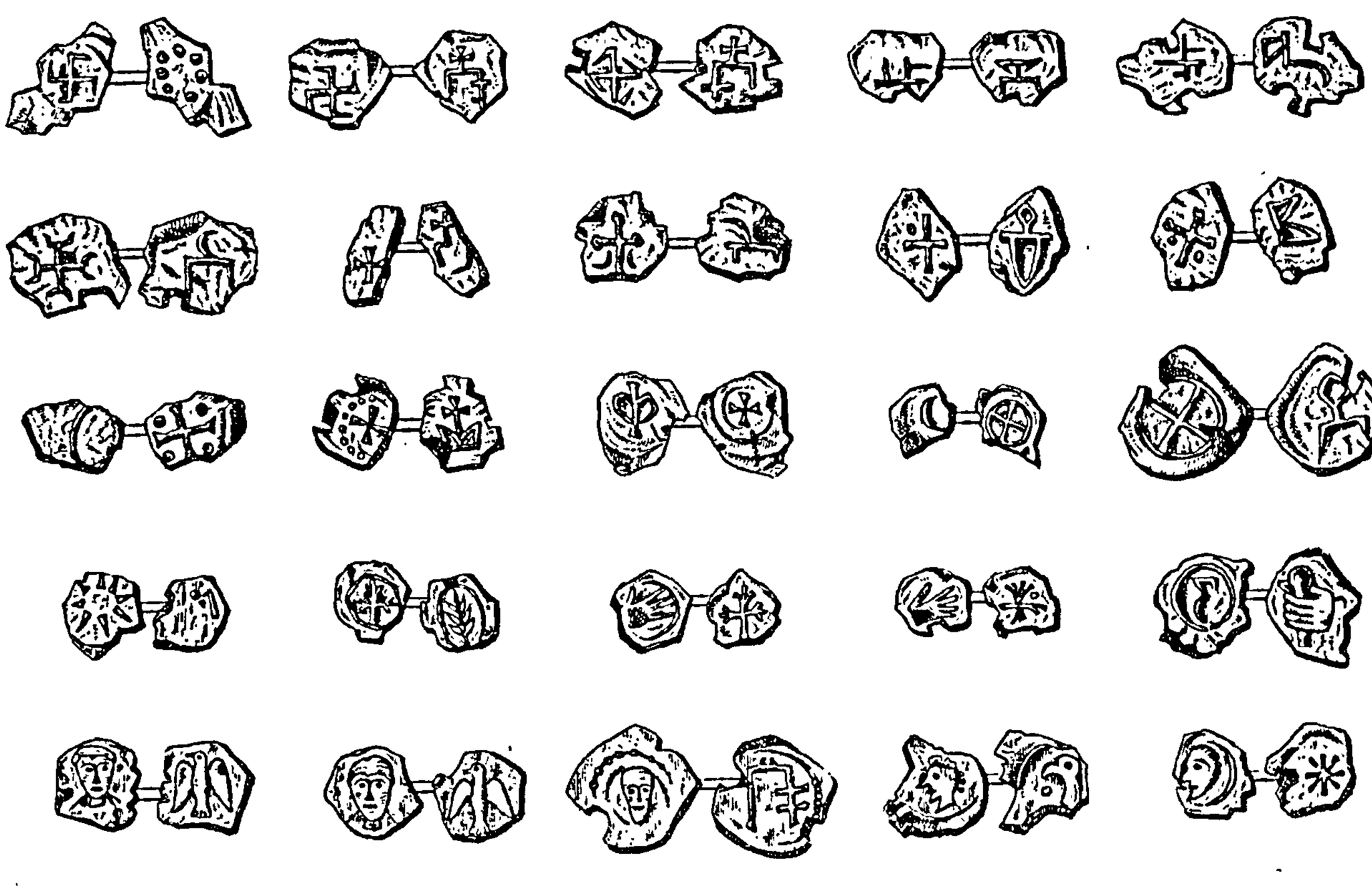

Fig. 17. Lead *plomby* from Drohiczyn (after Bołsunowski 1891).

There are many lead objects in the archaeological record of the region that could be those described by Abū Hāmid. They have been found in the main border trading towns of the Rus, including Novgorod, Pskov, Kiev, Ryazan and Drohiczyn (there is a particular concentration of such artefacts in Drohiczyn, a town in the navigable Pripet Marshes, now southern Belarus). These lead objects (known as *plomby*) were made in two parts, usually formed around the knotted end of a piece of string (Fig. 17). Typologically, they have been categorised according to their markings, which include letters, symbols and figures or, indeed, nothing at all (Bołsunowski 1891a; 1891b; 1895; 1896; 1897; Lewicki 1956a, 289-90 and 293). Some scholars, such as Bołsunowski (1891, 182), believe that those *plomby* with letters date from the 12th and 13th centuries and that those with symbols date from the 10th to the 13th centuries. About 25% of all of the *plomby* from Drohiczyn date from the 11th and 12th centuries and have

stamped marks relating to the Russian princes from this region and the Kievan prince Wszewołod Olgowicz (AD 1139-1146) in particular. These marks can be compared to similar marks on local coins and official stamps of this period (Lewicki 1956a, 293-96). The large quantity of *plomby* (more than 3,000 examples) and the many and varied commodities and artefacts (such as beads – over 1500 of different origins and materials) recovered from excavations in Drohiczyn (and also the many silver hordes from the surrounding area) suggest a large and extended trading region. Drohiczyn was a border trading centre with many merchants visiting from outside the region; if the pelts and *plomby* were indeed a form of non-silver monetary system, we must presume that in Drohiczyn there must have existed some kind of *bureau de change,* where the merchants could exchange their silver and pelts. In the Góra Zamkowa (part of the medieval town of Drohiczyn) the enormous quantity of *plomby* recovered could suggest such a place (Bołsunowski 1891b, 183-4; Lewicki 1956a, 296-97; Musianowicz 1956, 169-76). Unfortunately, because of erosion in the past, the associated buildings and structures have been lost; the proper excavation of the area is now impossible and the recovered *plomby* spread and unstratified.

Could Abū Hāmid really be describing the existence of a non-coinage monetary system using squirrel pelts? The text (and associated *plomby*) could be describing a true monetary system, one that could only be operated and controlled by a strong local authority. However, the *plomby* have also been interpreted as marks indicating the origin of a product or commodity – or as stamps indicating whether tax has been paid on the item. Zappa, writing at the end of 19th century, interpreted the *plomby* as indicators, marking trading products as proof that the proper taxes had been paid. Both Bołsunowski and Niederle later developed this theory, the latter using a 9th century historical source by the Byzantine historian Teofanes. Teofanes wrote of 8th century trade agreements between the Rus and Byzantium, describing lead markers used to indicate traded commodities. However, these markers were used on items exported from Constantinople by Rus merchants. Interestingly, one *plomby* has been found in Drohiczyn stamped with the mark of a king of Samos (an island in the Eastern Aegean) who ruled between AD 1250 – 1305; and several others have marks that resemble coins from Cherson (dating from the period that this

Crimean city was under Byzantine control) (Bołsunowski 1891b, 184-85; Lewicki 1956a, 293-94).

Both interpretations could contain elements of the truth. The native *plomby* could be modelled on foreign examples, but that their primary function had changed over time. The sheer quantity of the *plomby* from Drohiczyn (and their apparent concentration in Rus border trading towns), coupled with the expensive nature of the lead involved, would suggest that their primary function in the early medieval period was of local circulation. Interestingly, the birch-bark documents from Novgorod could also contain some evidence. The squirrel (*bela*) is the most common fur mentioned (it is mentioned in many texts dating from the 12th to the 15th centuries) and the contexts within which *bela* are mentioned indicate that the word had two meanings: referring to squirrel pelts as furs and squirrel pelts as money (Rybina 2001, 129-30). So, it is probable that fur is the best example of natural items being used as a standardised form of currency.

Fabrics

There is also evidence from the archaeological and historical records of similar items forming part of a system of standardised non-coinage based currency. Cloth, from an ethnographical standpoint, is often a standard of value and a unit of currency; as such it becomes an integral part of the treasury of rulers and is an important element of their political authority. There are many examples of cloth money from anthropological studies in Africa (such as Angolan raffia cloths or cloth money from the Congo) (Williams 1997, 207-208). Cloth not only has intrinsic value, but once it has been transformed into garments and other items (such as flags and banners), it becomes a potent agent to represent or misrepresent images, identities, ranks and values (Wincott-Heckett 1992, 185).

In some areas of medieval Europe cloth was accepted as a unit of currency and produced to legally determined sizes. In Iceland *wadmal* cloth was woven on the warp-weighted loom to specification and represented a regular unit of currency. The Frisian cloth *wede* or *pallium* was also used as currency. A further category of non-coinage based currency was the linen handkerchief or scarf used by the

Western Slavs. The use of the linen handkerchief as currency is known from the historical sources and has been illustrated by archaeological excavations such as that of the 9th century cemetery from Great Moravia, Uherskè Hradiště-Sady (Dzieduszycki 1995, 101). The 10th century Jewish traveller Ibrahim ibn Jacob describes thin, net-like handkerchiefs of an especially delicate material (which, according to him, were completely useless) and which were used as legal tender in Prague. He describes the handkerchiefs as being of considerable value to the Slavs, the price being always ten handkerchiefs for one silver dirham – and that they could be exchanged for goods at market (Sztetyło 1963, 510-16; Leciejewicz 1989).

In the archaeological record we also find a specific type of textile that has been recovered from coin hoards with a widespread distribution in the territories of the Western Slavs. The textiles have been found in coin hoards deposited in Poland since the 10th century – and the upper chronological limit, the mid-17th century, is marked by the beginning of the reign of King Kazimierz and the issuing of new mint regulations (in AD 1650), which bought about a radical transformation of the Polish currency (Pytlewicz 1998, 265). Some scholars (e.g. Jakimowicz 1933, 110) see these textile deposits as items of value in their own right, while others (e.g. Pytlewicz 1998) see them as merely functional. It would appear that coins in these hoards were separated into specific bundles by these cloths. It has been suggested that the cloths were a means of counting and weighing the coins (all the cloths have similar dimensions and each contained between 60g and 100g of coins) (Pytlewicz 1998, 268-69).

Many examples of coin hoards containing small separate bundles of coins have been found in the territories of Silesia, Greater Poland and the Pomeranian region from the 11th century (Sztetyłło 1963, 511). An example from Łagiszów Mały, for instance, was placed in twelve bundles and deposited in a pottery vessel; and a hoard from Sonnenwalde (Łużyce Dolne) contained seven bundles, each of a similar weight. Hoards from Kębłowo and Gostyń were deposited in a similar way, with ten linen bundles and two linen bundles respectively. There are many more examples of recovered hoards (e.g. Sztetyłło 1963, 511; Pytlewicz 1998, 268-69). Were the cloth bundles merely functional (little more than handy

money bags) or did they signify specific amounts? Interestingly, in all Slavonic languages the root of the verb 'to pay' is *płacić*, which is the same as the word for a piece of cloth, *płat* (Wyrozumski 1983, 248; Wincott-Heckett 1992, 186).

Cloth was an important element in trade in early medieval Europe, from long distance trade, such as Chinese silk, to more local markets, such as Frisian broadcloth – both of which were found at Birka (Geijer 1983, 80-99). Trade in cloth demanded both consistently high standards of the product and the development of units of measurement with which to deal. However, cloth was not always a significant item of trade; the *Raffelstetten Plea*, dating to between AD 903 and 906 and relating to tolls on the Danube on goods entering the Frankish Empire from the east, mentions salt and slaves as the principle merchandise and makes no special reference to cloth (Wyrozumski 1983, 250).

According to the Russian *Primary Chronicle* (or Nestor Chronicle), a history of the Rus compiled in Kiev in AD 1113, around the year AD 900 the Rus marched with the Varjags via Kiev towards Constantinople and Byzantium to plunder and trade. Peace treaties were formed in AD 907 and 945 between the Greeks and the Rus, which also meant the establishment of proper trade agreements. According to the *Primary Chronicle*, the Greeks traded gold, silk and brocade to the Rus in exchange for wax, furs and slaves or, at worst, promises of peace. The later trade agreements ensured limited quantities of the valuable Byzantine cloth were traded to the Rus, who could not buy more brocade than 50 gold pieces a head. The quality of silk and brocades was also checked and sealed by the Emperor's officials before export (Larsson 2002, 3).

In the early 9th century text *Vita Ansgarii* (The Life of St Ansgar), Rimbert tells us of established trading contacts between Birka and the important Frisian trading town of Dorestad, located to the west on the Frisian coast – trade that may be reflected etymologically as the Scandinavian word for cloth, *kläde*, is generally considered to be a derivative from Old Frisian *kleth,* which may have influenced the Old Norse *kleth-i* (Geijer 1983, 47; Larsson 2002, 8).

Further etymological evidence for trade includes the term *rips*, which may refer to fine broadcloth. *Rips* is present in most of the languages spoken around the Baltic and North Sea. In Danish, French and Russian the word *reps* is used, in Norwegian, German and Swedish *rips*, in Finnish *ripsi* and in Polish *ryps*. The English and Icelandic languages are exceptions. Linguistically, such a distribution of a term would well correspond with a common source of origin and point to a widely traded commodity (Larsson 2002, 10). A term for a specific type of cloth could also signify the measurement with which the cloth was gauged. Larsson describes the *rep*, a historically attested widespread early medieval measurement; this term may have arisen from the measurement by which the Frisian town of Riep sold its cloth. In a similar manner, the Norse term *wadmal* (meaning homespun) was formed. *Wadmal* simply means a measurement of woollen cloth. The word is formed by the Old Norse *vaðir* (woollen cloth) and *mal* (measurement) and is best translated by 'en våd' (a length), the measurement in which the domestic homespun cloth was produced and sold (Larsson 2002, 9). In Iceland the *wadmal* cloth served as currency and as a general standard of value. Fines, fees and taxes were fixed in *wadmal* (Einzig 1951, 270).

The staffs from Birka: analysis and interpretation

In the archaeological record there are objects that could be associated with fabric measurement. One of these objects was found in Kalisz, Poland. It is a wooden staff measuring 535 mm in length. On one of its sides are visible four notches of regular shape. The context within which it was found has been dated to the 11th century AD. The distance between the middle of the first notch and the middle of the second notch is half of a so-called German 'foot' (about 141 mm). Between the middle of the second notch and the middle of the third notch is half of a so-called Paris 'foot' (about 154 mm). Together, the length between the first and third notches equates to a Roman 'foot' (295 mm), which must have been one of the most commonly used classical measurements in use at the time (Baranowski, 2000).

Another possible category of such artefact comprises the enigmatic staffs recovered from Viking graves from Scandinavia (and particularly from Birka).

Most of these staffs have been discovered in female graves. The staffs have regularly spaced decorative knobs along their lengths – and one interpretation for these staffs is that they are measuring staffs for use with cloth, the knobs being spaced to provide units of measurement.

One example from Birka (Bj. 834) was 0.77 m in length when it was recovered, although now only 0.57 m remains. Its original length was probably greater. The iron shaft is approximately 10mm thick and is square in section, with two polyhedral knobs of bronze (with circle-and-dot decoration) located respectively 0.19 m and 0.44 m from the base of the 'handle'. The 'handle' measures 105 mm in length and was formed of ten twisted iron rods (of which one is now missing), joined above and below by polyhedral bronze knobs of the same kind as those on the shaft. All of the knobs are decorated with four circle-and-dot deigns on each four-sided facet, except for that at the point where the 'handle' joins the shaft, which had five dots. At the mid-point of the 'handle', the rods are encircled by a bronze band engraved with a repeating diamond pattern (Price 2002, 181).

From the Old Norse literature we can see that the various forms of staff described differed quite markedly in appearance. There are no explicit descriptions of a *gandr* or *gǫndull*, only circumstantial evidence that they came to a sharp point and were probably made of wood. The *gambanteinn* was made of wood, appears to have been quite slender and was perhaps carved with runes; this was probably the smallest of the staffs. The *vǫlr* may also have been wooden. The *stafr* was fitted with brass and set with 'stones', and had at least one knob; there in no indication of the material used for the main shaft. The *seiðstafr* could be quite large. As their name implies, the two *jàrnstafr* held by dream beings and giants were made of iron. Of course, it is unlikely that these descriptions are exact, or even representative; or even that one could suggest a match between these objects described by the sagas and archaeological artefacts (Price 2002, 181).

Price described a number of the iron staffs found in graves from all over Scandinavia (although principally western Norway), which all differ slightly in appearance but have common characteristics. He also described the small

number of comparable pieces which are also known in wood and noted similarities between the 'handles' of the staffs with those of contemporary keys (principally from Gotland), stating that "the terminal of the keys support the idea that the openwork device really was the handle of the staffs and that they were thus help at one end rather as one would grip a sword. However, some of the staffs themselves give the lie to this, for example that from Søreim in Norway, which has an openwork 'basket' far too broad for any but the largest hand to grip" (Price 2002, 189).

The polyhedral knobs on the shafts of the staffs are essentially the same as the polyhedral weights that are found throughout the Viking world (Price 2002, 191). The bronze knobs would have gleamed brightly when polished, in stark contrast to the iron shaft and handle – suggesting that they were the focus of the function of the staffs themselves. It is also possible that the knobs were fixed separately onto the staffs to ensure their correct distribution on the length of the shaft; and that their appearance (that of a weight) and decoration have connotations of measurement.

Interpretations of the function of the staffs have differed widely, from ornamental spits for roasting meat to fragments of lamp stands or whip-shanks. They may be items of fashion or of function – one interpretation describes the staffs as distaffs for spinning. Another popular early interpretation of the staffs was as measuring rods, an idea reinforced by the fact that several of them approximated an *ell* in length, a former measurement of length (about 1.14 m) in Old English. The staffs certainly resemble surviving late medieval measuring rods, which until recently were fixed to the doors of Gotlandic churches. Because the Viking Age examples were overwhelmingly found in the graves of women, it was proposed that the staffs were probably for measuring out lengths of cloth, the production of which was a female occupation (Price 2002, 182). One difficulty with this interpretation is the lack of standardisation seen between the staffs themselves. Every staff is different, including those that have perforation (thought to perhaps enable a measurement of pottery size to be taken by a rod inserted at right angles) or similar features. As has been demonstrated by studies of Viking Age weights, it is certainly possible to archaeologically evidence complex standardisation within

measurement systems of the period; as such, the staffs are unlikely to form part of a conventional system of measurement, if at all.

The most recent study of the Scandinavian staffs was that by Price, who felt that the staffs can "reasonably be placed within the general category of staffs of sorcery" (Price 2002, 181). It has long been noted that the staffs were likely to be status symbols of some kind and that their aesthetic dignity suggested something more then a mundane purpose. However, considering the staffs within the context of a metrological measurement system was an important test. A further category of the material culture of the Baltic Viking Age that should be considered within the context of a standardised metrological system is the widespread Slavonic pottery.

An introduction to standardisation in Slavonic pottery

Could pottery be used to illustrate the beginnings of widespread standardisation in units of measurement in the early medieval period of the Baltic Sea region? Slavonic pottery is found in large quantities throughout the Baltic rim and Scandinavia. Much of this Slavonic pottery is of a high standard and was either produced in Scandinavia by Slavonic craftsmen or slaves, or arrived as a traded commodity in its own right. While there are examples of Slavonic cooking vessels in the Scandinavian archaeological record – Feldberg pottery was found during excavations at Helgö for example (Holmqvist and Arrhenius 1964, 289-90) – much of the pottery may have been a traded commodity or have been used as storage vessels in trade. Pottery is a widespread archaeological resource (unlike many of the materials described above), both geographically and chronologically. The morphological standardisation of Slavonic pottery is already apparent and may suggest the possibility of a standardisation within volume. Widely used standardised vessel sizes – whether standardised by accident (for example as a result of the systemisation of production or as a functional response) or by conscious design – may imply the trading of exact and desired measurements of a commodity (such as honey or salt).

It is very possible that there were standardised volumes for some Slavonic pottery types. Many of these vessels were containers in which foodstuffs were cooked, consumed, transported or produced. The natural standardisation of a pottery size or shape, depending upon the task for which it was intended, may have become *de facto* measurements for these products.

Evidence of systematic standardised vessel volumes comes from the Islamic World, where glass stamps were used to indicate variously the volume weight and content of a glass vessel. These glass stamps took the form of a stamp applied to a gob of molten glass that had been applied to the rim of a cooling (but still plastic) glass vessel (Matson 1948, 41-42). These stamps were applied to vessels such as cups and bowls in order to indicate and authenticate their content. Thus, the vessels were official measures of volume (or sometimes of weight), certified to be of the legal standard by the *Dār al-'Ayār* (the Bureau of Standards), a branch of the *Dīwān al-Kharāj* (the Treasury). A wide variety of legends appear on the vessel stamps depicting measures (such as a *qisṭ*, an unknown quantity often mentioned in historical descriptions of payments of tax, or *mikyalah*, meaning simply 'measure') and contents (such as olive oil or ointment) (Miles 1948, 19).

There is a relevant and interesting passage regarding the use of the vessels bearing official stamps in the *Khiṭaṭ* by Al-Maqrizi, an Egyptian historian writing in the early 15th century AD. He describes the *Dār al-'Ayār* in Cairo: "*there was for the control* [of weights and measures] *a place known as the Dār al-'Ayār in which all the scales and weights were tested. The Imperial dīwān supplied everything that was necessary for this bureau, such as copper, iron, wood, glass and other equipment and also hired craftsmen, supervisors and the like. The inspector of weights and measures, or his deputy, went to this bureau so that everything that was made there could be tested in his presence. If they were correct, he certified them; and if not, he ordered them to be remade until they were correct. There were in this bureau patterns for testing the accuracy of the standards; and weights, scales and measures of capacity were not sold anywhere except in this bureau. All the merchants when summoned by the inspector of weights and measures came to the bureau with their scales and weights and measures for*

immediate testing. If any were found deficient they were taken up by the bureau from the owners and destroyed; and the owner was required to buy others that were accurate and to pay for them... This bureau was in operation throughout the rule of the Fāṭimids and when Ṣalāh al-Dīn came to power he continued the bureau and made of it a pious foundation... And this bureau still exists" (translation after Miles 1948, 20). Al-Maqrizi was using earlier sources and was describing a practice which probably antedated the Fatimid dynasty – and may even have originated with the Umayyads (Miles 1948, 20).

Such a system of systematic standardised vessel volumes may suggest that any idea of standardised vessel volume – Al-Maqrizi's "*measures of capacity*" – could have arrived in the Baltic region alongside the Arabic silver and Arabic weights and weight system.

Poland in the medieval period (and from as early as the 10th century) used one such measurement for tributes or taxes of cereals. This measurement was based on the *Mensura Sancti Adalberti*. This type of measurement may also have been used to measure different dry products (such as fruit or wax) and honey. In addition, from the 13th century in the Pomeranian region, traders with the Hanseatic League used a special vessel called *vas Slavonica* for trading liquids (Giliewicz 1965, 206-207). Other examples of standardised volumetric measurement from the historical sources include the *Cronicae et gesta ducum sive principum Polonorum* ('Chronicles and Deeds of the Dukes or Princes of the Poles'), written around AD 1115 by Gallus Anonymus, who describes standardised small vessels of beer (the *cebri*), a unit of measurement that lasted, linguistically, until the 18th century in Polish and Czech territories (Giliewicz 1967, 206). Similarly, a larger unit of about 200 litres, the *beczka* (literally, the barrel) operated from the early Slavonic period to the 15th century and, in some regions, even longer (Giliewicz 1967, 206).

Slavonic pottery is found in large quantities throughout the Baltic rim and is very likely to have contained a traded commodity. The possibility of standardised volumes of pottery is really explored in the next chapters. Widely used standardised vessel sizes (showing standardisation within a system of

measurements) may imply the trading of exact and desired measurements of a commodity such as honey. The pottery to be studied has been recovered from excavations around the Baltic and the North Sea. It is typologically Slavonic but does not necessarily originate from Slavonic regions.

Western Slavonic pottery

Western Slavonic pottery is found in large quantities throughout the Baltic rim and is very likely to have contained a traded commodity. The possibility of standardised volumes of pottery is fully explored in the next chapters and a 'hypothesis test' (Orton 1980, 203) undertaken, a study designed to test the possible existence of widely-used standardised vessel sizes. The pottery to be studied has been recovered from excavations around the Baltic and the North Sea. It is typologically Western Slavonic but does not necessarily originate from Slavonic regions.

Pottery in an international context

In a recent paper documenting the study of pottery assemblages from a number of (predominantly North Sea) Viking Age towns, Blackmore noted that "while the mechanisms governing the distribution of ceramics are complex, and not all imported pottery is evidence of trade as such, or even of direct contact, this subject holds great potential for interpreting patterns of, and chronological trends in, contact, exchange and consumerism" (2001, 22). Unfortunately, the subject is hindered by the wealth of material as yet unpublished, linguistic barriers and the multifarious approaches to the classification and quantification of the ceramics – it can be very difficult to compare data, assess the pottery and define chronologies and spheres of use.

Thin-section analysis of some of the earlier forms of Slavonic pottery (the Feldberg and Fresendorf wares) that have been found in Southern Scandinavian coastal sites indicates that at least some of the pots were possibly locally-made (Brorsson 2003, 231). However, later forms of Slavonic pottery (such as Menkendorf, Vipperow and Teterow wares) are found in much larger quantities.

While much of the pottery must have been used as table ware or cooking vessels, some must also have been used as storage containers – and some goods (such as salt, honey or mead) may have been transported or imported

within their containers. Recent experimental archaeology undertaken at Skaill House, Orkney, confirmed that ale could be brewed successfully using earthenware pots with lids sealed with beeswax (Wickham-Jones, C R and Card, N and Appleby, A and Cave-Browne, P and Isbister, A and Leith, P and Dineley, M and Dineley, G 2000, 196-99). Slavonic mead could have been made and transported in a similar fashion – the presence of foreign pottery at a site may indicate an import trade in foodstuffs. If the proportions of the different types of pottery present in the assemblage recovered from excavations at Birka remain consistent – and c. 33% of the assemblage has been studied – then Slavonic pottery comprises c. 12% of the total of 20,000 sherds. The volume would suggest that the wares arrived in Birka as containers for some kind of commodity, which has been suggested as salt or honey (Blackmore 2001, 37).

Tating ware: a trade in quality pottery

Tating ware is a distinctive black burnished ware with applied tinfoil decoration (Fig. 18). It dates to the later 8th and 9th centuries and has a wide distribution, spreading from the Rhine delta to reach sites throughout the Baltic and North Sea zones. Once thought to be evidence of liturgical rites (many of the early finds were from graves or from religious or high status sites), they have now also been found in 'normal' urban contexts and on rural sites (Blackmore 2001, 37). Tating ware is now interpreted as luxury tableware, perhaps used in conjunction with glass beakers when drinking imported wine. The widespread distribution of Tating ware is a good example of the contemporary trade in pottery – and presumably wine. The 'considerable' wine trade between Rhineland and the southern coast of England and the related distribution of Badorf ware and the later Pingsdorf ware – largely dating from the 9th century – is another good example (Dunning 1956, 218-33).

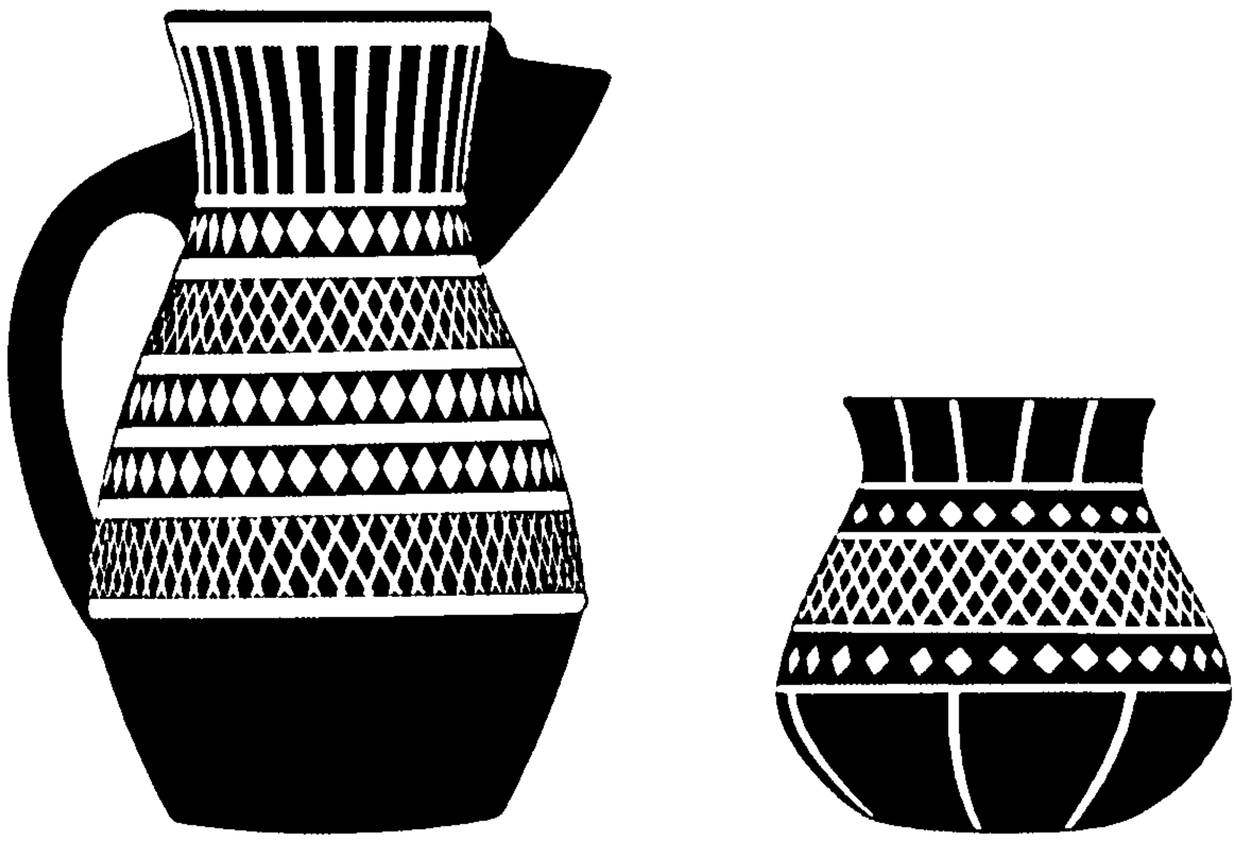

Fig. 18. Tating ware from Birka (after Gabriel 1991, 196).

Western Slavonic pottery

The pottery to be studied has been recovered from excavations around the Baltic and the North Sea. It is typologically Slavonic but does not necessarily originate from Slavonic regions. Only those pots where it is possible to measure and quantify their volume will be examined (whole pots and those where the complete profile may be established and where enough of the base has been recovered that its area may be ascertained). Whole pots from Wolin and Szczecin Museum were examined, with sand being used to quantify their volume. The results were compared with both the digital method of calculating the volume and various mathematical formulae.

In addition to the difficulties of positively identifying the provenance of Slavonic pottery, there are also many different regional typologies to contend with – typologies that ostensibly deal with the same (or at least very similar) pottery. For example, Sukow-type pottery from Mecklenburg in Germany (see Schuldt 1956) belongs to the same tradition of vessels as Dziedzice-type pottery in the Lower Parsęta region in Poland (see Łosiński 1972) and A/B-type from Szczecin (see Łosiński and Rogosz 1983; 1986). All relate to different Western Slavonic regions now divided by modern national boundaries.

Slavonic pottery has many typologies built by many scholars, ordered by, for example, the different techniques of pottery manufacture, the material fabric or

the many different vessel forms. The most complete and commonly used typology was proposed by Schuldt (1956), after a series of related papers (1954a; 1954b; 1954c; and 1955), the basis of which were excavations in the Mecklenburg region. The tables below illustrate all the different comparative typologies that have been created since (Figs. 19 – 21): the various authors occupy the fist line, with their respective associated excavations detailed in the second.

The problems arising from the conflicting typologies also extend into chronological horizons. The conflicting typologies have conflicting chronologies – concerning the same pottery tradition. As a result, the first typological chronology proposed by Schuldt (1956) – as opposed to his primary typology – did not satisfy most Polish scholars. The situation regarding the pottery of the whole Western Slavonic region was not fully rationalised and completed until 1986 (Łosiński and Rogosz).

The chronology of the Western Slavonic pottery to be studied roughly dates from the 7th to the 12th centuries – and relates primarily to the growth of Western Slavonic towns on the southern Baltic coast. Slavonic pottery from the interior (such as Tornow ware) does not form part of the study; nor does the later widespread phenomena of Slavonic-style 'Baltic ware', basic pottery produced locally throughout the Baltic from the 11th through to the 13th centuries (Roslund 1992, 159). Given the difficulties described above in relation to a defined typology for Western Slavonic pottery, it is unsurprising that widespread archaeological studies of the pottery and associated distribution maps concerning the whole of the Baltic Sea region have not yet been attempted. Indeed, in a recent study, Brorsson (2003) uses Schuldt's 1956 typology. He states that the Slavonic material present in Scania in Southern Sweden during the 8th and 9th centuries is largely represented by Feldberg and Fresendorf types (Brorsson 2003, 224). Pottery analysis has demonstrated that the majority was imported Slavonic pottery as well as some examples of locally made vessels of the same type (Brorsson 2003, 232).

Schuldt 1956, 1964	Wilde 1939	Łosiński 1972	Łosiński, Rogosz 1986	Kempke 1984a	Hensel 1950, 1959	Vogel 1972
Mecklenburg	Wolin	Pomorze Środkowe	Szczecin	Oldenburg	Wielkopolska	Wagrien
Sukow		Dziedzice	A	Unverzierte Ware, schwach verzierte Ware	A	A
Sukow		Dziedzice	B	Unverzierte Ware, schwach verzierte Ware	A	A
Feldberg	AII:3b–3.1	Kędrzyno, Bardy	C	Prachtkeramik Wulstrandtöpfe Kammstrichware	B	B

Fig. 19. Early Western Slavonic pottery (1st Horizon)

Schuldt 1956 and 1964	Wilde 1939	Łosiński 1972	Łosiński and Rogosz 1986	Kempke 1984a	Hensel 1950, 1959	Vogel 1972
Mecklenburg	Wolin	Pomorze Środkowe	Szczecin	Oldenburg	Wielkopolska	Wagrien
Menkendorf	AII:2b, AII:2c, AII3b–W4-W12	Szczecin	D	Kammstrichware	C	C
Woldegk	AII:1b, AII:3c2	Bardy	E	Rippenschulterware		
Fresendorf	AII:3a2–W1.1	Wolin	F			

Fig. 20. Middle Western Slavonic pottery (2nd Horizon)

Schuldt 1956 and 1964	Wilde 1939	Łosiński 1972	Łosiński and Rogosz 1986	Kempke 1984a	Hensel 1950, 1959	Vogel 1972
Mecklenburg	Wolin	Pomorze Środkowe	Szczecin	Oldenburg	Wielkopolska	Wagrien
Vipperow	AII:3b-W15, W16, W19, W22, W23		G	Gurtfuurchenware	D	D
Type from Vipperow	AII:3b		G1	Gurtfuurchenware		
Weisdin	AII:1b-W13, W14		H	Gurtfuurchenware	D	D
Teterow	AII:3c2-W17, W18, W20.2, W21, W22		J	Gurtfuurchenware	D	D
n/a	AII:3c2–W20.1		K	Gurtfuurchenware		
Bobzin	AII:3a1–W1.2		M	Gurtfuurchenware		D

Fig. 21. Late Western Slavonic pottery (3rd Horizon)

The following pages catalogue the various types of Western Slavonic pottery as described by Schuldt (1964), separated into their respective chronological horizons (Łosiński and Rogosz 1983; 1986). The 1st horizon (AD 600 – 800) is characterised by hand-built pottery with the upper parts finished (smoothed) using the wheel: Sukow and Feldberg. The 2nd horizon (AD 800 – 950) is characterised by hand-built pottery with the upper parts shaped using the wheel: Menkendorf, Fresendorf and Woldegk. The 3rd horizon (AD 950 – 1200) is characterised by hand-built pottery entirely shaped using the wheel: Viperow, Teterow, Weisdin, Bobzin,

1st horizon (AD 600 – 800)

Sukow (including Prag): this term was proposed by Schuldt (1964) for the oldest, most primitive hand-built (made without the use of a wheel) undecorated early medieval pottery in the Mecklenburg region (Fig. 22). Schuldt established this term as more of a catchall to describe the early stage of medieval pottery in the Mecklenburg region than as a distinct type of pottery; this group also includes the Prag type of pottery. In the Szczecin typology, built for the Szczecin Castle Hill excavation (Łosiński and Rogosz 1983; 1986) this term corresponds to type A (hand-built pottery) and type B (hand-built pottery with smoothing of the upper part on the wheel) (Łosiński and Rogosz 1983; 1986).

Łosiński (1972) named this type of vessel the Dziedzice type in his studies of the Lower Parsęta region. Technically, the Sukow tradition is very primitive and not very well-fired; in form, they are generally slender vessels with quite a high proportion having the break (the widest point of the vessel body and marking the 'break' between the upper and lower body) located high on the vessel body. The Sukow tradition includes not only cooking vessels but also a range of plain medium sized jars and globular bowls. It is found over most of northwest and western Poland. It dates from around the late 6th century AD. A later element of the overall Sukow tradition (also known as the Sukow-Gołańcz phase) reflects the Szczecin typology (Łosiński and Rogosz 1983; 1986): the vessels are finished on a slow wheel and are typically squat and rounded in form. This pottery seems to continue into the 8th century AD before being replaced by the Feldberg tradition.

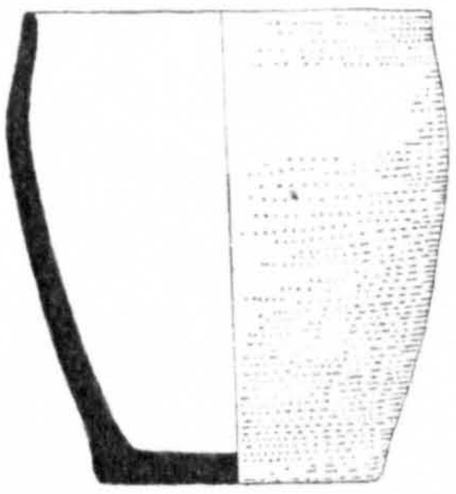

Fig. 22. Sukow type (after Bastian *et al*. 1973 Taf. 17/59/1).

Feldberg: Schuldt's Feldberg type (Fig. 23) from Mecklenburg corresponds to type C in the Szczecin typology, which has been divided into two sub-categories, 'a' (with an undefined rim and either undecorated or with shallow groove decoration) and 'b' (with a well-defined rim and with deeply grooved rich decoration created on the wheel). In the Lower Parsęta region typology, 'a' corresponds to the Kędrzyno type (with the upper part only smoothed on the wheel – not shaped) and 'b' to the Bardy type (with the upper part shaped on the wheel) (Łosiński 1972; Łosiński and Rogosz 1986). In the Wilde (1939) typology the Feldberg vessels correspond to the to $3_{,1}$ type. The vessels are squat and rounded in form. Decoration is located above the break and shows motifs of wavy lines and horizontal strips of punctures made using a comb. This material is now dated to the period between the mid 8th century and the mid 9th century and is usually found in northern Polabia and western Pomerania (Barford 2001, 105).

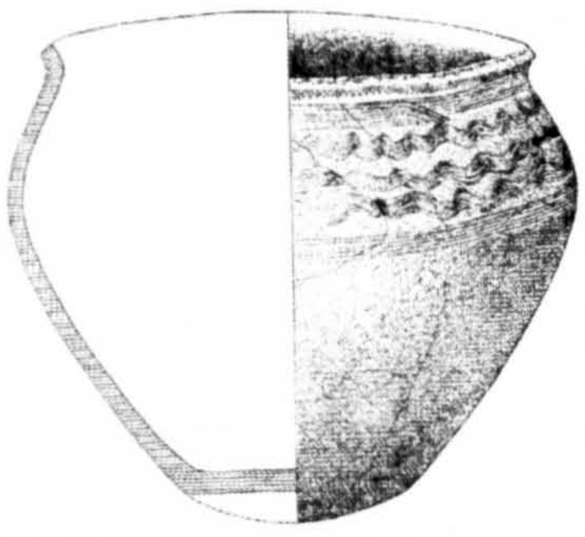

Fig. 23. Feldberg type (after Schuldt 1956 Abb. 16/a).

2nd horizon (AD 800 – 950)

Menkendorf: Schuldt's Menkendorf type (Fig. 24) corresponds to type D in the Szczecin typology and to the Szczecin type in the Lower Parsęta typology. It also corresponds to types W4 – W12 in Wilde's Wolinian typology (1939). The vessels are partly shaped and smoothed on the wheel, although they are not very well made and the decoration is poor. They generally have a frustum shape and a sharp break in the vessel body. Early versions of these pots occasionally have an S-shaped profile. The rims are basic and the decoration is located above the break of the body of the vessel. The patterns are zigzags made with a comb, oblique crosses, vertical allures and broad wavy lines. Frustum shaped vessels have a low break.

Menkendorf pottery is largely found on the Baltic coast, in the region later occupied by the Obodrites; however, it is also found inland, to the south and west. It seems to date from the 9th and 10th centuries. The angularity and decorative schemes of the Feldberg and Menkendorf pottery (and of the contemporary Tornow tradition found in central Poland) is thought to have been influenced by the form and decoration of contemporary Frankish pottery (Barford 2001, 105); in turn, the shape of the Rus' Ladoga pottery tradition was clearly influenced by western Slavonic Menkendorf pottery (Brorsson (2001, 52).

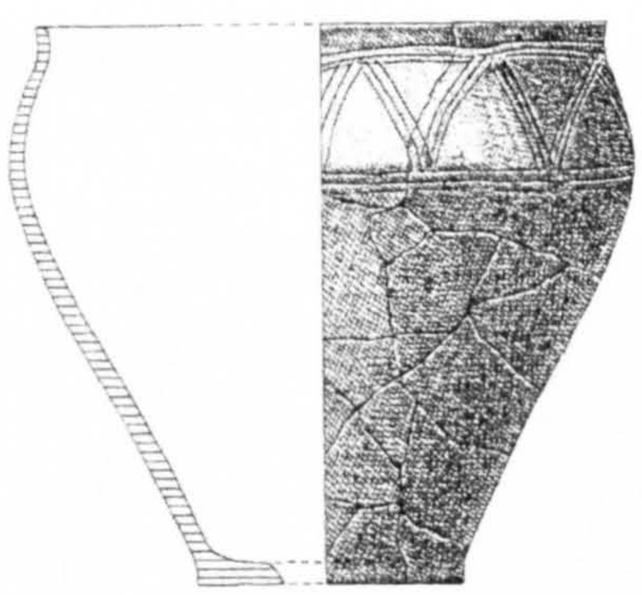

Fig. 24. Menkendorf type (after Lüth, Schoknecht 1995 Abb. 153).

Fresendorf: this is the most characteristic of the pottery recovered from the excavations in Wolin (Fig. 25). Wilde (1939) classified it as W1,1. Filipowiak (1955) classified it as 'inverted pear-shaped vessels'. In the Lower Parsęta typology it corresponds to the Wolin type and in the Szczecin system to type F. They are globular vessels with a small base, a wide mouth, an inverted rim and a break located high on the vessel body. The decoration is the most characteristic feature of these vessels. It is a groove about 10mm in width, which is located just under the rim and very often resembles a cordon. The decoration underneath this groove (but above the break) often consists of wavy lines, oblique cuts and allures. Technically they are well made, hand-built and shaped on the wheel.

Fig. 25. Fresendorf type (after Lüth, Schoknecht 1996 Abb. 131/f).

Woldegk (Woldegker): In the Lower Parsęta typology Woldegk (Fig. 26) corresponds to the Bardy type and in the Szczecin system to type E. Wilde (1939) classified it as W3,2. They are characterised by very rich zonal decoration, often consisting of wavy lines, oblique cuts and allures. They are both globular and frustum-shaped vessels and are hand-built and shaped on the wheel.

Fig. 26. Woldegk type (after Schuldt 1956 Abb. 31/a).

3rd horizon (AD 950 – 1200)

Vipperow: the Vipperow type (Fig. 27) corresponds to types G and G_1 in the Szczecin typology. The G type has two variations: 'a' (with an S-shaped profile) and 'b' (globular with an everted rim). The G_1 type is technically better made and is later in date; the vessels are decorated only by banded grooves although the rims are often very richly decorated. The Vipperow type corresponds to Wilde's classifications of W15, W16, W19, $W22_{,4}$ and W23. The Vipperow type has banded grooves that cover about two thirds of the vessel, with wavy lines, oblique cuts and allures located above the break in the vessel body. The Vipperow type of vessels are hand-built and shaped on the wheel.

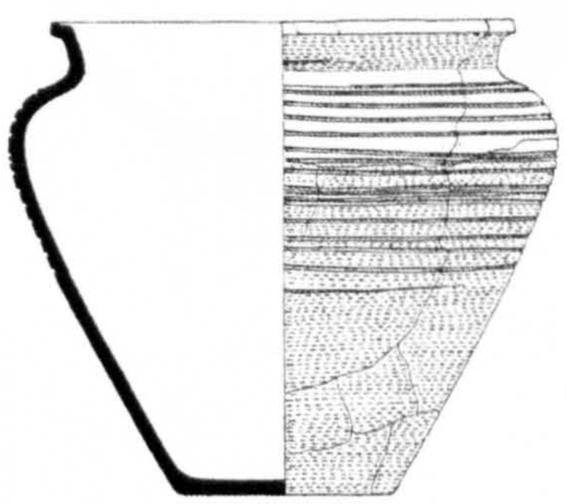

Fig. 27. Vipperow type (after Bastian *et al*. 1973 Taf. 6/3/16).

Teterow: the Teterow type (Fig. 28) corresponds to type J in the Szczecin typology and to Wilde's types $W17_{,3\text{-}4,}$ W18, $W20_{,2\text{-}3,}$ $W21_{,2}$ and $W22_{,1\text{-}3}$. The Teterow type is globular in shape with a well-defined neck (which is sometimes decorated) and everted rim. The decorations are very similar to the Vipperow type.

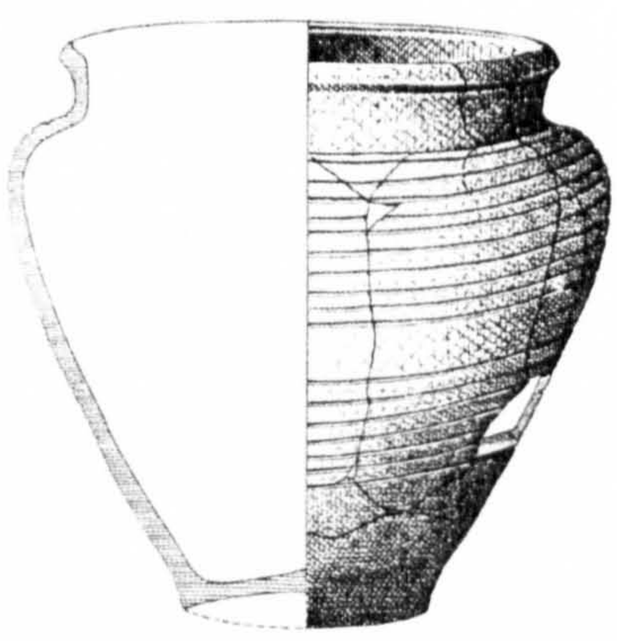

Fig. 28. Teterow type (after Schuldt 1956 Abb. 55/a).

Weisdin: the Weisdin type (Fig. 29) corresponds to type H in the Szczecin typology and to Wilde's types W13 or W14. These vessels are large storage pots, hand-built and shaped using the wheel. These vessels are characterised by zonal decoration, much like the Woldegk type. Cordons separate different zones of decoration. The combinations of decorative motifs are many, with a huge range of oblique crosses, wavy lines, oblique cuts and sometimes (although very rare) braids.

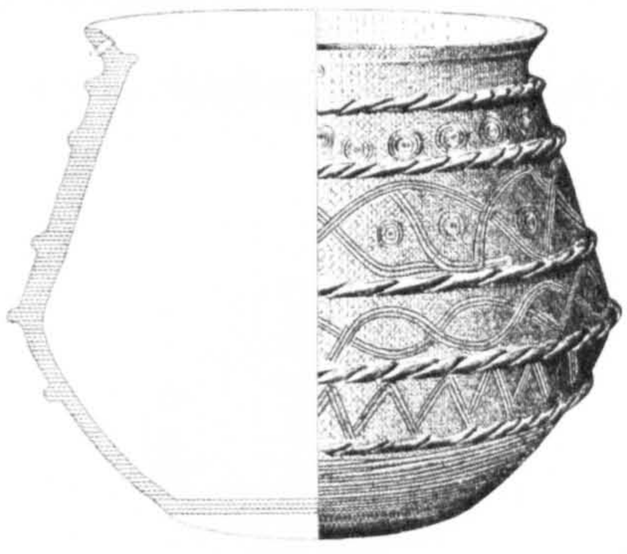

Fig. 29. Weisdin type (after Schuldt 1956 Abb. 73/a).

Bobzin: the Bobzin type (Fig. 30) corresponds to type M in the Szczecin typology and to Wilde's types W1.2 and W2. They are globular in shape, hand-built and shaped using the wheel. In form they are similar to the Fresendorf type and Kowall type but have a break located low on the vessel body (1/2 – 2/3 high). The rim is thin and bevelled internally. The decoration is banded grooves, wavy lines, oblique cuts and allures. The banded grooves are sometimes very strongly incised, giving the impression of a cordon. This type of vessel generally has a lid. Some of these vessels have vertical cuts, which match cuts on the lid. Sometimes these vessels have handles and horizontal rows of lumps with vertical holes, which could be used to hang the vessel.

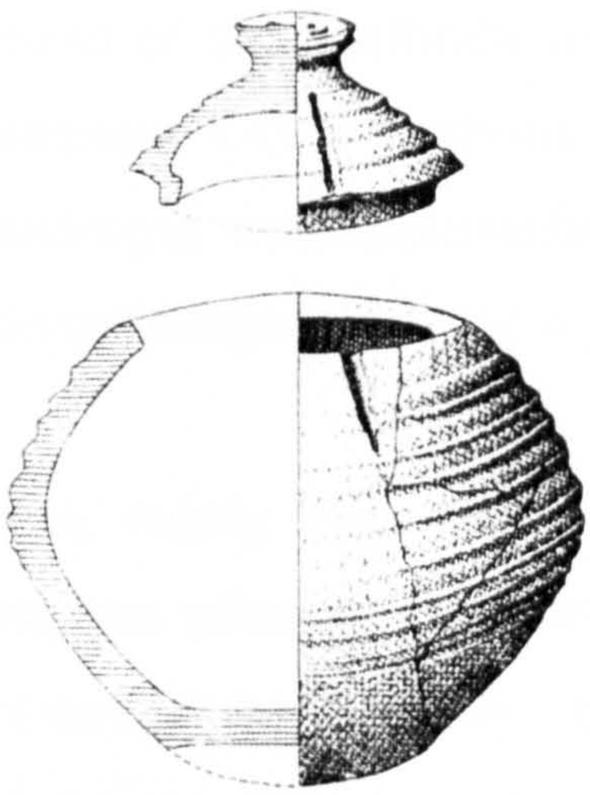

Fig. 30. Bobzin type (after Schuldt 1956 Abb. 45/e).

The methodology of vessel volume quantification

Most archaeological analyses of pottery study only their morphology, yet most vessels were manufactured as containers in which foodstuffs were cooked, stored, served or transported. The volume of such vessels is as essential an attribute as form, both being indicators of use and function. The quantification of the volume of vessels has been relatively neglected in most archaeological analyses of ceramics. Woodward and Blinkhorn note that "scant attention has ever been paid to variations in vessel size, yet it is surely this parameter that should most directly relate to the use of any vessel as a container (1997, 153). However, various methods for determining vessel volume do exist. Unfortunately, most of the methods used to measure volume require whole or reconstructed vessels. Other methods, if based on specific key measurements of a vessel (for example measurements of height and diameter), are only relevant when the assemblage analysed is highly standardised in terms of vessel form.

The highly fragmented nature of most archaeological ceramic assemblages makes whole (or potentially reconstructible) vessels relatively rare finds. Vessel volume has rarely been systematically quantified because convenient reconstruction methods dealing with sherds and peculiar vessels have been lacking (Senior and Birnie 1995, 319).

In order to investigate the potential trade function of the Western Slavonic pottery found throughout the Baltic region from the early medieval period or Viking Age, the author has analysed the volume of the available whole or reconstructed pots. The aim was to discover if any form of standardised units existed in the Slavonic pottery of this time. Most studies concerning the standardisation of pottery manufacture implicitly assume that such production efficiency is nothing but the by-product of the routine and large-scale manufacture of such pottery. However, further examination suggests that such standardisation can be linked to more complex levels of socio-political organisation – being rooted in a concern for specific, market-related volumetric measures. Prior to beginning the research, various different techniques were used to measure the readily quantifiable

volume of modern and historical pottery; on the basis of this initial experiment, it was possible to choose that method most appropriate to conduct the research on the archaeological assemblage. In addition, before commencing the research various useful general manuals and texts were consulted, concerning the archaeological study of pottery (e.g. Kołosówna 1953; Ericson and Stickel 1972; Orton, 1980; Rice, 1987; Orton, Tyers and Vince 1993; Juhl 1995); relevant studies of early medieval Slavonic pottery (e.g. Schuldt 1956; Schuldt 1981; Cnotliwy, Leciejewicz and Łosiński 1983; Buko 1983; Kempke 1984a; Parczewski 1988; Buko 1990; Parczewski 1993; Staňa 1994; Brather 1996; Lüdtke and Schietzel 2001); relevant studies of trade in early medieval pottery (e.g. Dunning 1968; Reed 1990; Roslund 1992; Gaimster 1999; Brorsson and Stanisławski 2000; Blackmore 2001; Brorsson 2001; Roslund 2001; Brorsson 2003); relevant studies of pottery form (e.g. Buko and Werfel 1990); and other similar studies of vessel volume quantification (e.g. Kóćka 1959; Kramarek 1960; Rottländer 1966; Ericson and DeAtley 1976; Blake 1997; Woodward and Blinkhorn 1997; Berg 2004).

The pottery to be studied has been recovered from excavations around the Baltic and the North Sea. It is typologically Slavonic but does not necessarily originate from Slavonic regions. Only those pots where it is possible to measure and quantify their volume were examined (whole pots and those where recovery has enabled the complete profile be defined and enough of the base has survived in order that its area may be calculated). Whole pots from Wolin and Szczecin Museum were examined, with sand being used to quantify their volume. The results were compared with both the digital method of calculating the volume and various mathematical formulae.

Different methods of measuring volume

There are several methods of measuring volume capacity within archaeological assemblages, each being described below. The method chosen by the researcher is largely dependent upon the nature of the archaeological material to be studied and the research objectives. For example, the use of physical fluid or dry methods is limited to complete or reconstructed vessels and any study

cannot include drawn pottery references. In addition, such physical methods risk damage and contamination to the antique vessels studied, including any fragile painted decoration or residues.

Basic vessel capacity can be defined in at least two ways: the total possible capacity or absolute volume; and the effective volume or useable volume. The absolute volume does not often represent the practical capacity of the vessel, but it is easily replicable between researchers. The effective volume represents the practical measure of capacity and is obviously subjective (although a careful individual researcher can safely claim consistency). Thus, throughout this thesis, vessels were examined twice. They were first measured to the rim to show a 'total possible capacity', before being measured to the neck (or to the point where the vessel is considered to be full, usually the narrowest point in the neck of the vessel) to show the 'effective volume'.

The methods that were employed during this study of basic vessel capacity were the fluid volume method; the dry volume method; measured mathematical methods (both the geometric solids method and the summed cylinders method); and digitising scaled drawings (using AutoCAD) for use with an improved mathematical summed cylinder method.

Fluid volume method

At its most basic, this method involves measuring the amount of water that a vessel can contain. Accurate and easy, this method is advantageous because it does not require any special equipment or programmes for calculation. However, there are several limitations. Water has a tendency to be absorbed by the vessel walls, which can create an error. This can be remedied by lining the vessel with plastic before the water is added – or by consistently measuring the capacity after the vessel walls are fully saturated. However, most museums and other institutions will not allow the use of water for fear of damage or contamination. The method is also reliant upon whole pots.

Dry volume method

This method can be performed with any kind of free-flowing solid (such as sand, lentils or rice), although many museums only permit the use of lightweight polystyrene packing material, as polystyrene is believed to be a stable, inert substance that will not damage or contaminate the vessel in any way. This method is similar to the fluid volume method, but may not be as precise. Errors can be introduced as a result of irregular packing tendencies and the presence of air spaces between the particles.

Sand was used within this research to illustrate the dry volume method. Before measuring the volume of pottery using sand there are many difficulties to consider. Dry laboratory sand must be used (sand where the average particle size has been calculated) and the delicate nature of these small pots recognised.

To make accurate measurements of the volume of vessels using sand, the sand structure, packing and constant mass must first be understood. Close packing reduces the size of the air spaces (the space between the particles of sand) and thus reduces the overall volume of air space. Open or loose packing has the converse effect (Pettijohn 1975, 73). Because the pottery is fragile we cannot make the packing of the sand as tight as would be required to eliminate this error; and the larger the vessel, the larger this error is likely to be. Indeed, the larger the vessel or the more complex its shape, the more likely it is that the packing will vary (including both loose and close) within each individual example, with weight and distribution also as variables.

During the measurement of the volume of a pottery vessel with sand there are two packing values to account for. There is both the packing of the sand within the pot and the packing of the sand within the measuring jar – thus, the sand packing value is changing two times. So, to alleviate the *double error* that occurs when the pottery is measured in this way, we can *weigh* the sand and exchange this into the volume, rather than simply record the volume of the sand from the measuring jar. To do this we need to calculate the density of the sand that is being used using the following calculation:

$$Qs = ms / Vs$$

Note: Q_s – specific density of soil frame (here this refers to sand) [$g \cdot cm^{-3}$]; m_s – mass of soil frame; V_s – volume of soil frame [cm^3], this mean volume of fill up soil from constant particle. Constant mass of soil frame have been calculated from Y_s ($g \cdot cm^{-3}$) then $Y_s = Q_s \cdot g$; and Q_s - specific (peculiar) density of soil frame; g – Earth acceleration (9.806 m/s^{-2}; 32.174 fts^{-2}) (Myśliwska 1992).

In addition to the use of dry laboratory sand, the measurements must all be taken in a consistent environment – as temperature and moisture can affect the packing and weight of the sand. Inconsistency can create another error within the analysis of any pottery assemblage.

Mathematical methods

Most vessel forms can be described as a selection or combination of geometric forms. Thus individual vessel shapes could be described using a numerical code (Ericson and Stickel 1973). This code incorporates the geometric form(s) involved and the appropriate measurements (in millimetres) of the vessel used in the volumetric formulae (e.g. radius, diameter and height), together with the mean wall thickness. For example, a round-sided bowl with a flat base would be considered a truncated hemisphere (H) with a spherical segment (SS) removed from the base. Assuming this vessel has a radius of 200mm and a thickness of 7mm, and the removed segment has truncated radius of 180mm and a height of 30mm, its shape would be expressed by the descriptive code as H 200 (SS 180/30). A complex vessel shape – for example, the hemispherical bowl with a high collar – would be described as a hemisphere (H) missing a segment (SS) for its flat base, combined with the cylinder (C). The cylinder has a radius of 120mm and a height of 100mm; the hemisphere has a 120mm radius; and the segment has a truncated radius of 65mm and a height of 35mm; average wall thickness is 8mm. The code description of this vessel is C 120/100 – H 120 (SS 65/35). This

dimensions can them be substituted in the appropriate formulas, in order to calculate the volume or capacity of the vessel (Rice 1987, 220).

Kramarek (1960) proposed one of the many methods for the calculation of the volume of vessels. He calculated the volume of a vessel by using basic mathematical formulae that related to the combination of the geometric forms relevant for the particular pot (Fig. 31). The volume of the simpler forms of vessels can be calculated straight from the formulas. For other, more complicated forms of vessels, combinations must be used.

Fig. 31. Formulae for Calculating Volumes of Geometric Shapes:

Sphere	$V_s = 4/3\ \pi r^3$
Hemispherical	$V_H = 2/3\ \pi r^3$
Spherical segment	$V_{SS} = \pi r^2\ (r - h/3)$
Spherical segment B	$V_S = \pi r_1^2\ h/2 + \pi r_2^2\ h/2 + \pi h^3/6$
Frustum	$V_f = \pi h/3\ (r^2_1 + r_1 r_2 + r^2_2)$
Ellipse	$V_e = 4/3\ \pi abc$
Cylinder	$V_c = \pi r^2\ h$
Cone	$V_k = \pi/3\ r^2\ h$

Note: *r* - radius; *r1* - radius of bottom of the cylinder; *r1* - radius of top of the cylinder; *h* – height; *a* – vertical axis; *b* – largest horizontal axis; *c* – smallest horizontal axis; Π – 3.14. Sperical segment B - In this formula the r - radius of the vessel could have two lengths, depending on the form of the vessel and how precisely it was made.

Using an urn from Mokronosa Górna, pow. Wrocław, a cemetery of the Hallstat period (Fig. 32), Kramarek (1960) calculated the first segment from formula of frustum (neck with orifice); second segment from the spherical segment B (body); and the third from the frustum (base) thus:

First segment: π – 3.14; r_1 – 6 cm; r_2 – 8 cm; h – 2 cm
Second segment: π – 3.14; r_1 – 6 cm; r_2 – 10 cm; h – 10 cm
Third segment: π – 3.14; r_1 – 4 cm; r_2 – 10 cm; h – 8 cm

First segment:
V = (3.14 x 2) / 3 x (36 + 48 + 64) = 2.09 x 148 = 309.32cm³.
(Volume = 0.309 l.)

Second segment:
V = (3.14 x 36 x 10) / 2 +(3.14 x 100 x 10) / 2 + (3.14 x 1000) / 6 = 565.2 + 1570 + 523 = 2658.2cm³.
(Volume = 2.658 l.)

Third segment:
V = (3.14 x 8) / 3 x (16 + 40 + 100) = 8.37 x 156 = 1305.72cm³.
(Volume = 1.306 l.)

He therefore calculated the volume of the whole vessel to be 4.273 l. In this case the volume of this vessel is, in reality, less by about 10%, because the author failed to take into consideration the thickness of vessel wall (Kramarek 1960). Indeed, the accuracy of the geometric representation depends upon how smoothly the inside surface of the vessel mimic the set of shapes used to render the volume estimate.

The advantages of this mathematical 'geometric solids' method are that it can be applied to fragmentary as well as whole vessels; all that is needed is a complete vessel profile so that all the pertinent attributes could be measured. Thus

accurate drawings can be included in the study and all that is required is a ruler and a calculator.

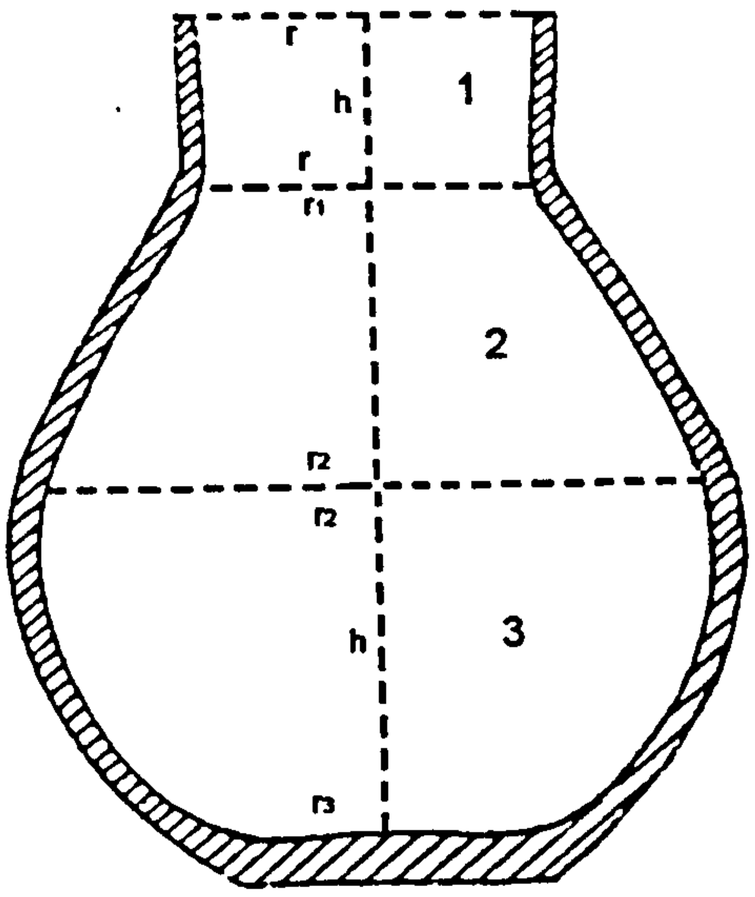

Fig. 32. The Hallstat Urn used to demonstrate the mathematical 'geometric solids' method (after Kramarek 1960, 155).

However, a more accurate mathematical method for estimating the volume of a vessel is the 'summed cylinders' method, whereby the vessel is envisioned as divided horizontally into a series of equal slices, the measurements representing, in effect, the diameters of this series of thin cylinders. Stacked one on top of another, these cylinders represent the entire vessel (Fig. 33). Each cylinder has a volume that is determined by the height of cylinder and the top and bottom radii (Okulicz, 1955; Nelson 1985; Woodward and Blinkhorn 1997). By calculating the volume of each cylinder ($Vc = \pi r^2 h$) and adding the resultant figures, the volume of the vessel is determined. Obviously, the narrower the cylinders, the more accurate the calculation of total volume.

Formula for summarising the volume of a vessel:

$$Vv = \left(\sum_{i=1}^{n} r_1^2 \right) \pi h$$

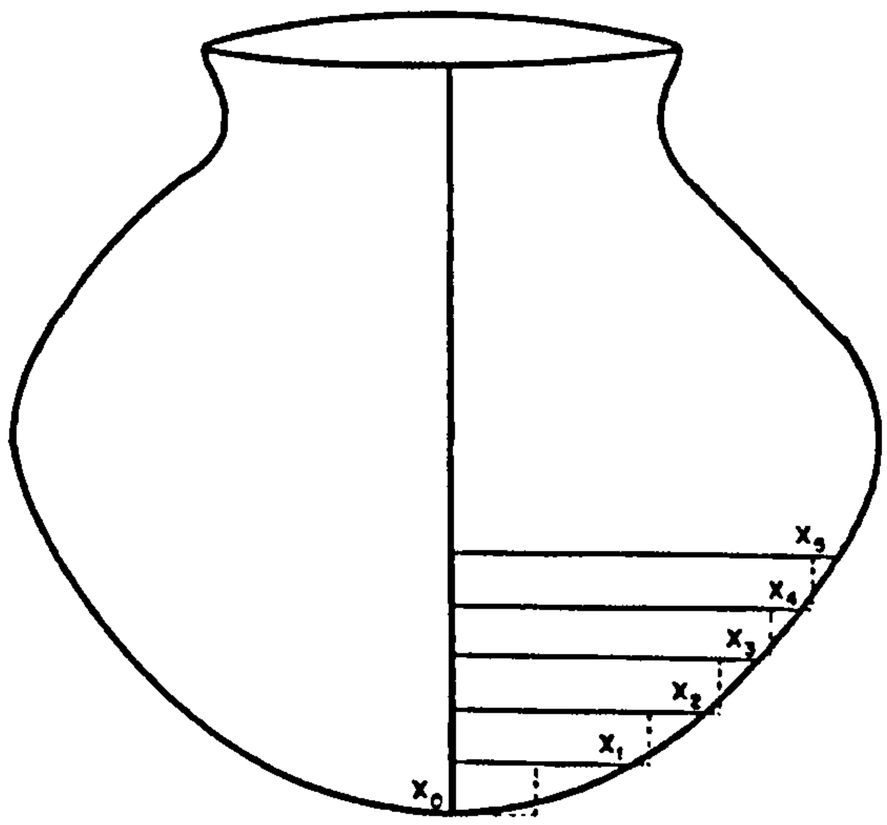

Fig. 33. The 'summed cylinders' method of estimating the volume of the vessel. The vessel is divided into cylinders, the volume of each cylinder is calculated by the formula given, and then these are summed to give an estimate of the total volume of the vessel (after Nelson 1985, 313).

The limitation of this 'summed cylinder' method lies in the rough boundary formed by the many cylinders of different diameters stacked on each other, creating voids, which accumulate an error between the actual volume and the calculated volume. The method is very time consuming – although this can be expedited through the use of a computer spreadsheet programme. Such a programme would quickly process the computation and store the estimated capacities so that they could later be statistically compared.

Digitising the scaled drawing of the vessel under consideration (using AutoCAD) can take the 'summed cylinder' method one stage further. The 'summed-cylinder' method is improved, being made more accurate by digitising the profiles of individual vessels into a computer. The algorithm, rather than being restricted to vertical-walled cylinders, incorporates the calculus for cylinders with slanted edges. The edges match as they are stacked and thus provide a smoother, more continuous, rendition of the vessel profile. This gives a shape that is much smoother than that given by the vertical-walled stack (Fig. 34). The vessel is divided into a series of equal horizontal cylinders split into a large number of horizontal discs, each with a height of 0.1 mm. The points used to define the vessel outline (input using a scaled drawing and the digitising tablet) are used to define each cylinder. Each bevelled cylinder has a volume that is determined by the height of the cylinder and the top and bottom radii; defined as *h*, *r1* and r2 respectively (Richards 1987).

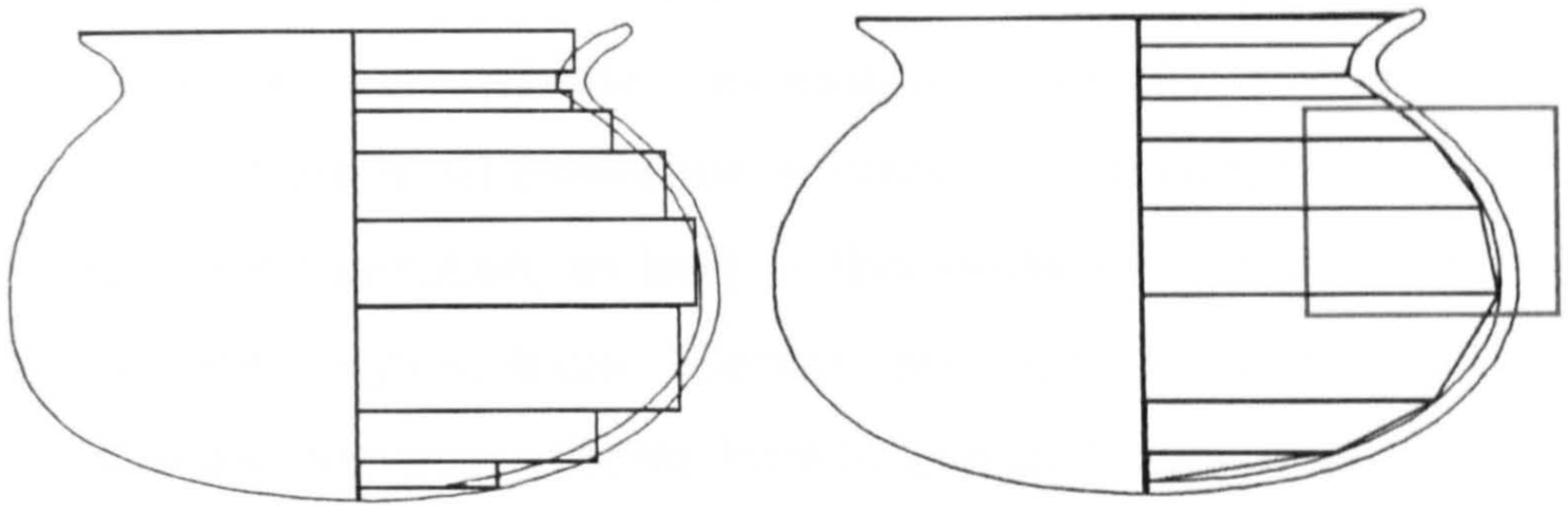

Fig. 34. Schematic representation of the use of bevel walled cylinders for integrating the volume of a vessel (after Senior and Birnie 1995, 323).

The upper bevelled cylinder has r1 as the top radius, r2 as the bottom radius, and h1 as the height. After equation 1 has been evaluated for this slice, then the summation moves to the next slice in sequence. To force the bevelled cylinders to match smoothly the bottom radius from the previous cylinder is used as the top for the next one; thus r2, r3 and h2 will be used for the next calculation and so on (Senior and Birnie 1995, 324).

$$V = \sum_{i=1}^{n} \pi * h_i/3 * (r^2_{1i} + r_{1i}\, r_{2i} + r_{2i}^2)$$

The profile is digitised using AutoCAD taking a small number of points per vessel (20 to 30 points are usually sufficient). There is no specific guideline on how closely the data points should be spaced along the section. The number of points required, their position and their spacing largely depends on the degree of regularity of the curve of the vessel and the level of accuracy needed. The

programme can also be used to calculate the volume of a vessel where only a half-section (one side) is available – as long as the location of the midline of the pot is specified. There is no difference in calculated accuracy between digitising a half or whole-pot illustration, as long as the vessels in question are recognised as being normally symmetrical (Senior and Birnie 1995, 324-25). Visual inspection of whole Slavonic vessels from Szczecin Museum and Wolin indicates that the vessels are symmetrical.

As in all methods there are percentages of error, which are result of both human mistakes and mechanical intolerance. From the recovery of the vessel by excavation to its eventual incorporation into this study, many errors can creep in. The pottery fragments must be reconstructed (a subjective science), an illustration prepared (where the vessel profile reconstruction, rendering of scale and photocopying intolerances may all create inaccuracies) and then digitised (the more an illustration is reduced, the greater the possible errors introduced by slight differences in the location of digitised points). However, the advantages of this method include ease, consistency and scope.

The modern experiment and its implications

The author first established an experiment using modern vessels in order to demonstrate which of the above methods will be the most suitable for determining the volume of the historical vessels.

The author measured the volume of twelve modern vessels of different sizes and shapes using different methods of measurement, which were explained in detail above. The sand method (using both loosely packed and tightly packed sand); mathematical formulae (using the 'summed-cylinder' method); measuring the volume using water; and the digitising method (using the improved 'summed-cylinder' method).

For this experiment a sample of 300g of dry laboratory quartzite sand was used (*middle granular*) with 58.1% being between 0.6mm and 0.3mm in size. The

consistency of the sample is of great important (see above) and its characteristics are set out below (Fig. 35).

$$Q_s = 2.64\ g/cm^3$$

$$Y_s = 25.88784\ g/cm^{-3}$$

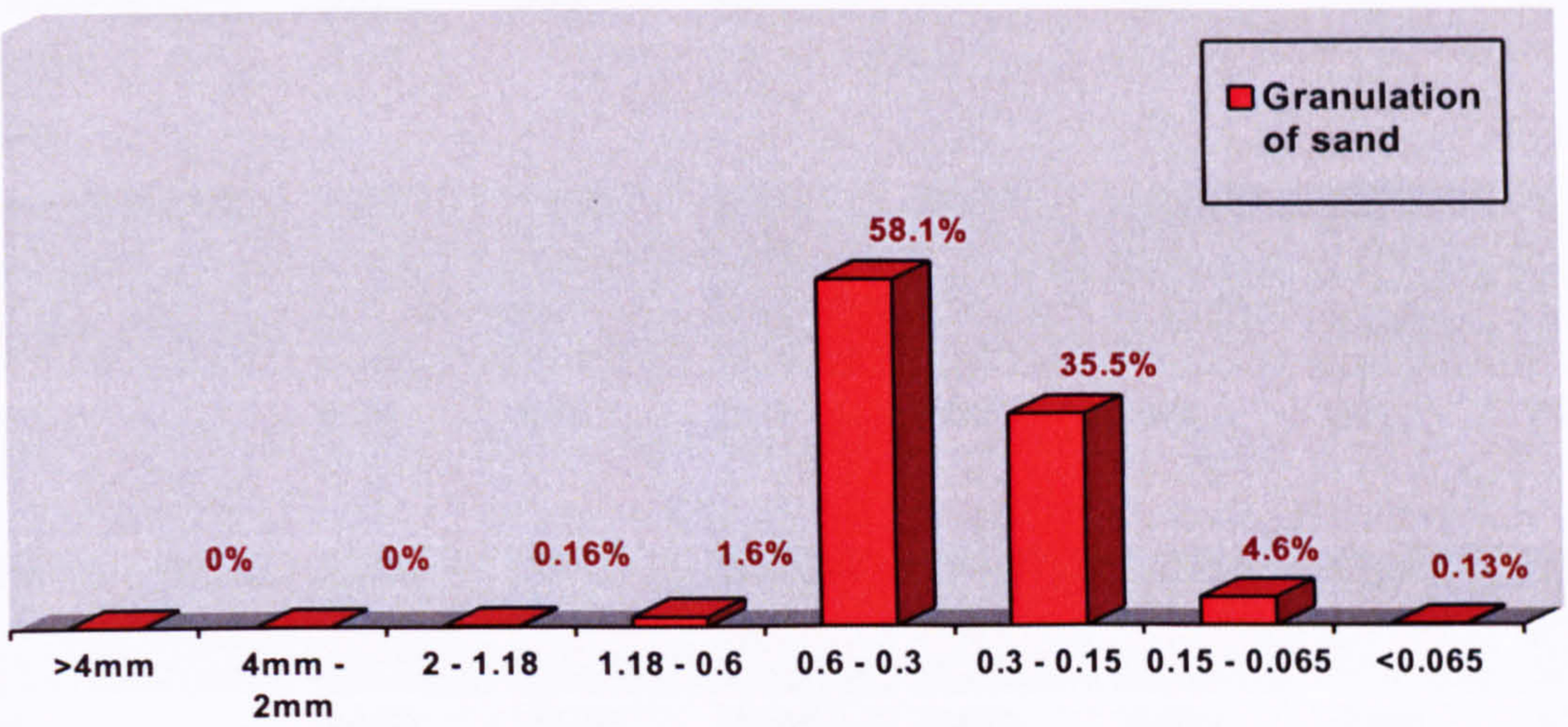

Fig. 35. The composition of the dry laboratory quartzite sand (*middle granular*) used.

The vessels have different forms (from the very simple to the complicated) and different sizes (from small to large). This will allow a degree of 'perfect' laboratory control (including the glass measuring cylinders) and will also demonstrate the difficulties involved in dealing with the more varied shapes and sizes of the historical vessels. The results are shown in the table below, comparing the differences in accuracy encountered when measuring the volume of vessels using several different methods. The modern bowls and pots were chosen either for their similarities to historical Slavonic vessels, or for their basic shapes, including both simple and complex. The glass measuring cylinders (vessels 1 and 2) are straight-sided measuring vessels – they have been used as control, but in reality bear little resemblance to pottery shapes. Sand fills them very evenly and their measurements of volume were read from the sides of the jars (unlike vessels 3 – 12, which were filled from the measuring cylinders). Sand fills different sizes and shapes of pottery in different ways and the other control vessels (vessels 3 – 12) have been chosen to demonstrate this. In general, the compaction value of sand rises with the size of the vessel that is filled. The compaction value of sand is greater in a large body of sand, as the weight of the

sand forces the grains to settle in the greatest density possible – and more sand can be added from the measuring cylinders. However, the varied shapes of the vessels measured complicate this simple equation.

Nr	Vessel	A	B	C	D	E	F	G
1	Glass measuring cylinder 500ml	500	500	487	500	496	500	500
2	Glass measuring cylinder 1000ml	1000	1000	982	1000	994	1000	1000
3	Bowl	615 0%	640 + 4.1%	631 + 2.6%	660 + 7.3%	645 + 4.9%	601 - 2.3%	607 - 1.3%
4	Bowl	3100 0%	3200 + 3.2%	3170 + 2.2%	3440 + 11%	3398 + 9.6%	3050 - 1.6%	3047 - 1.7%
5	Pot	4060 0%	4170 + 2.7%	4098 + 0.9%	4450 + 9.6%	4402 + 8.4%	3880 - 4.4%	4023 - 0.9%
6	Pot	3050 0%	3150 + 3.3%	3091 + 1.3%	3400 + 11.5%	3380 + 10.8%	3100 + 1.6%	2998 - 1.7%
7	Pot	1250 0%	1290 + 3.2%	1278 + 2.2%	1370 + 9.6%	1356 + 8.5%	1233 - 1.4%	1231 - 1.5%
8	Pot	5200 0%	5380 + 3.5%	5350 + 2.9%	5900 + 13.5%	5821 + 11.9%	5261 + 1.2%	5142 - 1.1%
9	Pot	4550 0%	4700 + 3.3%	4680 + 2.8%	5000 + 9.9%	4913 + 8%	4235 - 6.9%	4505 - 1%
10	Pot	450 0%	465 + 3.3%	460 + 2.2%	490 + 8.9%	475 + 5.5%	443 - 1.6%	445 - 1.1%
11	Pot	860 0%	890 + 3.5%	870 + 1.2%	950 + 10.5%	938 + 9.1%	901 + 4.8%	851 - 1.1%
12	Pot	1360 0%	1410 + 3.7%	1390 + 2.2%	1560 + 14.7%	1500 + 10.3%	1297 - 4.6%	1336 - 1.8%
	Average % Margin of error	0%	3.4%	2.1%	10.7%	8.7%	2.9%	1.3%

Fig. 36. The modern experiment: testing the various methods and establishing their average percentage margins of error.

Note: All measurements are shown in millilitres. A - volume calculated using fluid method, B - volume of incompact sand (i.e. loosely packed), C – calculated volume from weight of B, D - volume of compact sand; E – calculated volume from weight of D, F - volume calculated using summed cylinders method, G - volume calculated using digitisation and improved summed cylinders method. The average % margin of error (depicted in red) is calculated from only ten vessels – the glass measuring cylinders are control vessels and their shapes do not correspond to the real shape of the Slavonic vessels.

The estimated accuracy of the methods used to measure the volumes of the vessels varies. The estimated accuracy of the methods have been assigned based on the sources of error discussed in the text – and must only be thought of rough estimated guides to the accuracy of the methods. The direct volume measurements (water and sand) have different estimated accuracies: the water method is clearly very accurate (and formed the control measurements), while the different sand methods vary, being clearly dependent upon compaction (and have average percentage margins of error of between 2.1% and 10.7%). The rudimentary mathematical method realised fluctuating results (an average percentage margin of error of 2.9%), while the digitising method proved fairly consistent (and had an average percentage margin of error of 1.3%). However, both the mathematical methods and the digitising method rely on experienced illustrators (and digitisers) – human error must also be considered a factor.

Thus, the most accurate method is by using water and this was the accuracy control for my experiment. Measuring the capacity of the vessels by using water is the most obvious and expedient way to do it. Unfortunately, this method has limitations regarding its use with historical vessels. Most museums and other institutions will not allow the use of water for fear of damage and contamination. It is also possible for water to be absorbed by the vessel, creating a small possibility of error. The method can also only be used in regard to whole vessels.

The sand method also requires complete vessels. In this method factors of error are created by the varying degrees of compaction and distribution within the vessel. The stringent environmental controls are also a drawback. The different

errors of accuracy in regard to the volumetric measurement are not consistent – and this is one of the main problems concerning the sand method.

Mathematical formulas are accurate and do not require whole vessels (or even the physical presence of the pot), just an accurate drawing. With a simple vessel the mathematical method is very easy and the percentage of error is very small. However, the complications begin when the vessels have more complicated shapes (as most of them have).

In conclusion, the best method is clearly to digitise the vessel profile and use the improved 'summed cylinders' mathematical formula. This method is both cheap and relatively easy – and its scope (requiring only scaled drawings) enables the researcher to assess a very large assemblage of vessels from the published archaeological record and excavation archives.

A study of vessel volume quantification in early medieval Western Slavonic pottery

The following tables contain the results of a desk-based study of vessel volume quantification in early medieval Western Slavonic pottery. As described in the previous chapter, the method used to quantify the volumes was to digitise the vessel profile (from published excavation catalogues) and then use the improved 'summed cylinders' mathematical formula to calculate the volume. A large number of published excavation reports were checked, only a number of which contained the illustrated and scaled pottery that now form the basis of the catalogue. The excavations included within the catalogue are too numerous to list, but those that provided more than the usual solitary pot include investigations at Birka, Groß Raden, Mecklenburg, Menzlin, Oldenburg, Rügen, Szczecin and Wolin. The majority of pots were recovered from excavations at settlements, defended settlements and towns – although some were recovered from graves. Where relevant, the graphs, tables and maps below refer to individual pottery types, presented in chronological order (Prag, Sukow, Feldberg, Menkendorf, Fresendorf, Woldegk, Vipperow, Teterow, Weisdin and Bobsin). The complete catalogue contains 779 pots and can be found in Appendix 1, the list containing individual information regarding site; pottery type; volume; site type; and bibliographical reference. In order to monitor for human error during the measurement calculations, approximately 10% of the sample was doubled-checked. The results are supplied as a secondary figure denoted in blue (contained within Appendix 1) and, although small differences were to be expected, the results confirm an overall consistency in the recording.

The two main weight systems in use in Viking Age Scandinavia can be summarised as follows: the Islamic trade system, based on the market dirham (two-thirds of a mitqal or 2.822g); and the Swedish/Islamic system, based on the larger three-mitqal unit (12.7g). The evidence concerning the weights and weight systems were described in Chapter Four. However, the actual weight sets used by merchants and traders were fractions based on the main systems. To obtain smaller weights, the Islamic trade system divided the dirham into quarters and

eighths. The Swedish/Islamic system divided the three mitqal unit weight (12.7g) by 2, 4, 8 or 16 to obtain smaller weights. The sixteenth-part weight (0.8g) may have been a kind of standard weight, for its multiples of 2 (1.6g) and 3 (2.4g) are common sizes in the Swedish material (Sperber 1996, 54-5).

Following what is known about the weight systems in use at the time, it seemed sensible to look for rough groupings within the volumes present in the catalogue and then to search for multiples. The rough groupings were immediately apparent (numbers of pots formed 'clusters' around certain sizes, with distinct gaps forming between) and the multiples then suggested themselves.

Taking a basic unit of 600ml, it would appear that there are distinct clusters around multiples of three (1800ml and 3600ml) and of associated units in between (particularly 2400ml). This also correlates with a pair of pots recovered from excavations at Wolin (Fig. 37), one found inside the other, the larger (Catalogue Primary Identification Number 1; Vipperow type; 2468ml) readily proving to be twice the capacity of the smaller (Catalogue Primary Identification Number 2; Vipperow type; 1250ml).

Fig. 37. The pair of standardised pots from Wolin (photograph: author's own).

However, only some of the pottery types (Feldberg, Menkendorf, Teterow and Bobzin) conform to this pattern; the others do not appear to have any recognisable characteristics of volume standardisation. The pottery types are described in chronological order; where standardisation occurs a graph is provided (indicating the quantities present around each volumetric cluster) alongside a table (indicating the actual measurements and affording a detailed appreciation of the extent of clustering) and a distribution map indicating the

findspots of the pots used in the catalogue. The complete pottery catalogue is provided in Appendix 1.

Prag and Sukow

Prag and Sukow ware does not appear to have been standardised; despite quantifying the volumes of 140 pots, no patterns emerge from the data.

Feldberg

Despite the early date of the Feldberg ware, a pattern did emerge from the volumetric data (Figs. 38 – 40); clusters are visible around the suggested multiples of the 600ml unit. Of the 90 pots measured, the greatest numbers of pots were between 1200ml and 3600ml; such pots would easy to handle and transport, even when full.

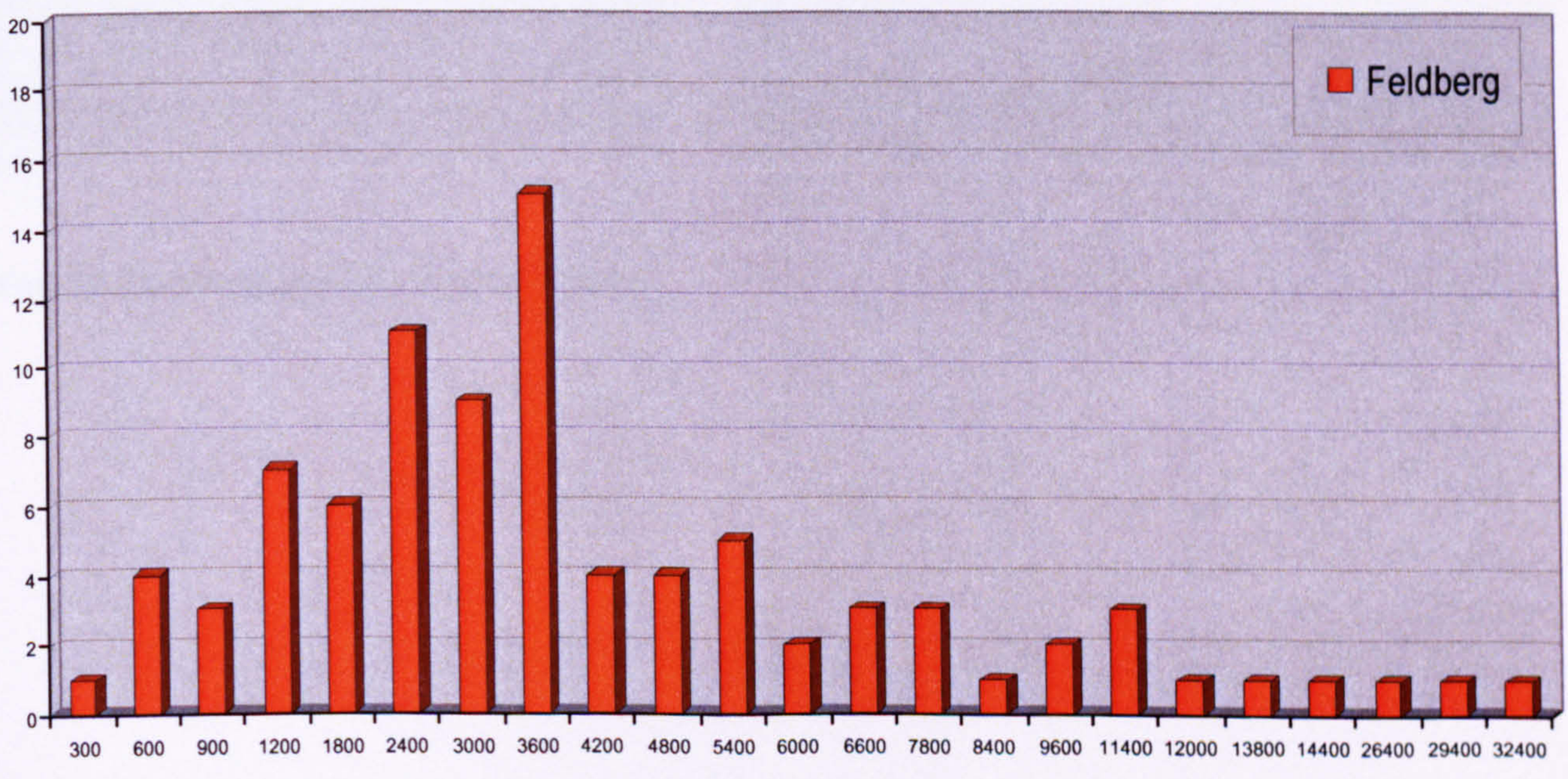

Fig. 38. Feldberg type volumetric quantity (indicating the quantities present around each volumetric cluster)

N° \ ml	300	600	900	1200	1800	2400	3000	3600	4200	4800	5400	6000
1	327.07	554.82	885.74	1161.49	1779.71	2332.66	2930.79	3524.58	4184.80	4833.14	5403.15	5946.16
2		581.36	927.54	1175.04	1723.66	2352.21	2932.90	3541.29	4223.38	4861.61	5465.02	6017.92
3		698.43	948.08	1233.34	1751.42	2369.90	2962.66	3564.88	4247.89	4864.83	5513.51	
4		676.61		1268.12	1773.23	2395.23	2965.27	3567.50	4279.77	4917.02	5518.70	
5				1271.36	1812.40	2398.60	3027.56	3570.40			5531.89	
6				1274.17	1841.02	2443.91	3032.76	3596.77				
7				1304.07		2494.49	3052.51	3614.60				
8						2498.97	3098.52	3647.46				
9						2511.82	3102.73	3661.67				
10						2519.68		3693.39				
11						2537.62		3694.48				
12								3699.91				
13								3716.61				
14								3719.49				
15								3721.08				

N° \ ml	6600	7800	8400	9600	11400	12000	12600	13800	14400	26400	29400	32400
1	6529.59	7761.87	8480.14	9615.64	11339.52	12018.59	12574.74	13750.62	14372.17	26447.98	29511.95	32327.64
2	6712.43	7912.75		9648.95	11437.67							
3	6714.88	7917.93			11518.75							
4												
5												

Fig. 39. Feldberg type volumetric pattern

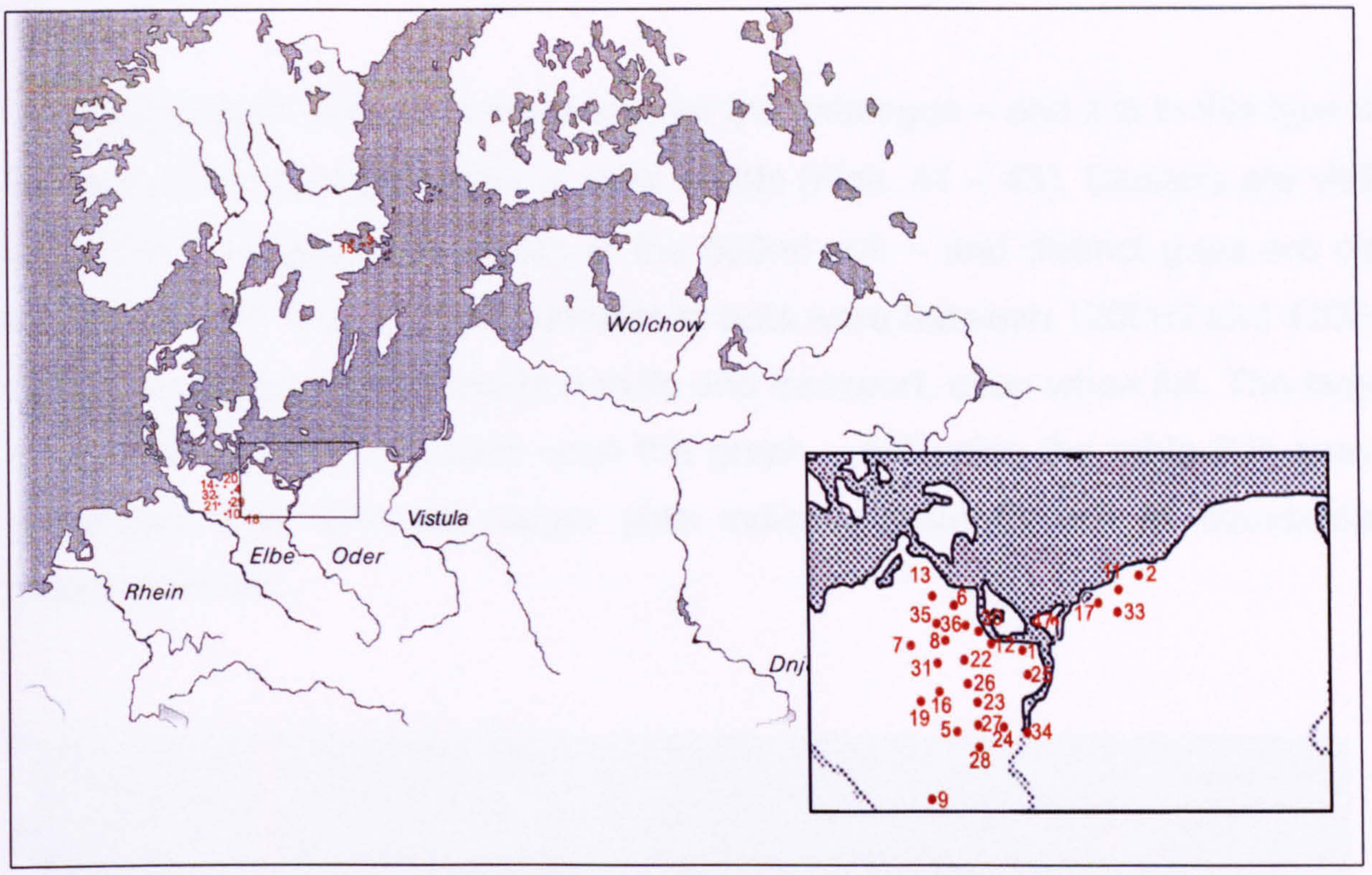

Fig. 40. Feldberg type findspots

Feldberg:
1. Anklam (Kr. Anklam); **2.** Bardy (Woj. Zachodnio – Pomorskie); **3.** Birka; **4.** Bobzin (Kr. Lübz); **5.** Dahmen (Kr. Teterow); **6.** Dambeck (Kr. Greifswald); **7.** Dargun (Kr. Malchin); **8.** Fahrenhorst – (Forst) (Kr. Lübz); **9.** Feldberg (Kr. Neustrelitz); **10.** Gielow (Kr. Malchin); **11.** Gołańcz Pomorska (Woj. Zachodnoi – Pomorskie); **12.** Görke (Kr. Anklam); **13.** Grimmen (Kr. Grimmen); **14.** Groß Strömkendorf (Kr. Wismar); **15.** Helgö; **16.** Janow (Kr. Anklam); **17.** Kędrzyno (Woj. Zachodnio – Pomorskie); **18.** Klein Markow (Kr. Teterow); **19.** Malchin; **20.** Mecklenburg Dorf (Kr. Wismar); **21.** Meetschow (Kr. Lüchow – Danneberg); **22.** Menzlin (Kr. Anklam); **23.** Neubrandenbug (Fischerinsel) (Kr. Neubrandenburg); **24.** Pasewalk (Kr. Neustrelitz); **25.** Putzar (Kr. Anklam); **26.** Rattey (Kr. Neubrandenburg); **27.** Rühlow (Kr. Neubrandenburg); **28.** Schwarz (Kr. Neustrelitz); **29.** Sternberger Burg (Kr. Sternberg); **30.** Stolpe (Kr. Wolgast); **31.** Strasburg (Kr. Strasburg); **32.** Sukow (Kr. Teterow); **33.** Świelubie (Woj. Zachodnio – Pomorskie); **34.** Szczecin – Wzgórze Zamkowe (Woj. Zachodnio – Pomorskie); **35.** Wetzenow (Kr. Pasewalk); **36.** Wolgast (Kr. Wolgast); **37.** Wolin (Woj. Zachodnio – Pomorskie)

Menkendorf

193 Menkendorf pots were measured for the catalogue – and it is in this type that the pattern of standardisation is most visible (Figs. 41 – 43). Clusters are visible around the suggested multiples of the 600ml unit – and distinct gaps are clear between them. The greatest numbers of pots were between 1200ml and 4200ml; again, such pots would easy to handle and transport, even when full. The largest pots have not been included upon the graph – but using the table it is easy to appreciate that even the larger pots indicate systemisation of standardised measurements.

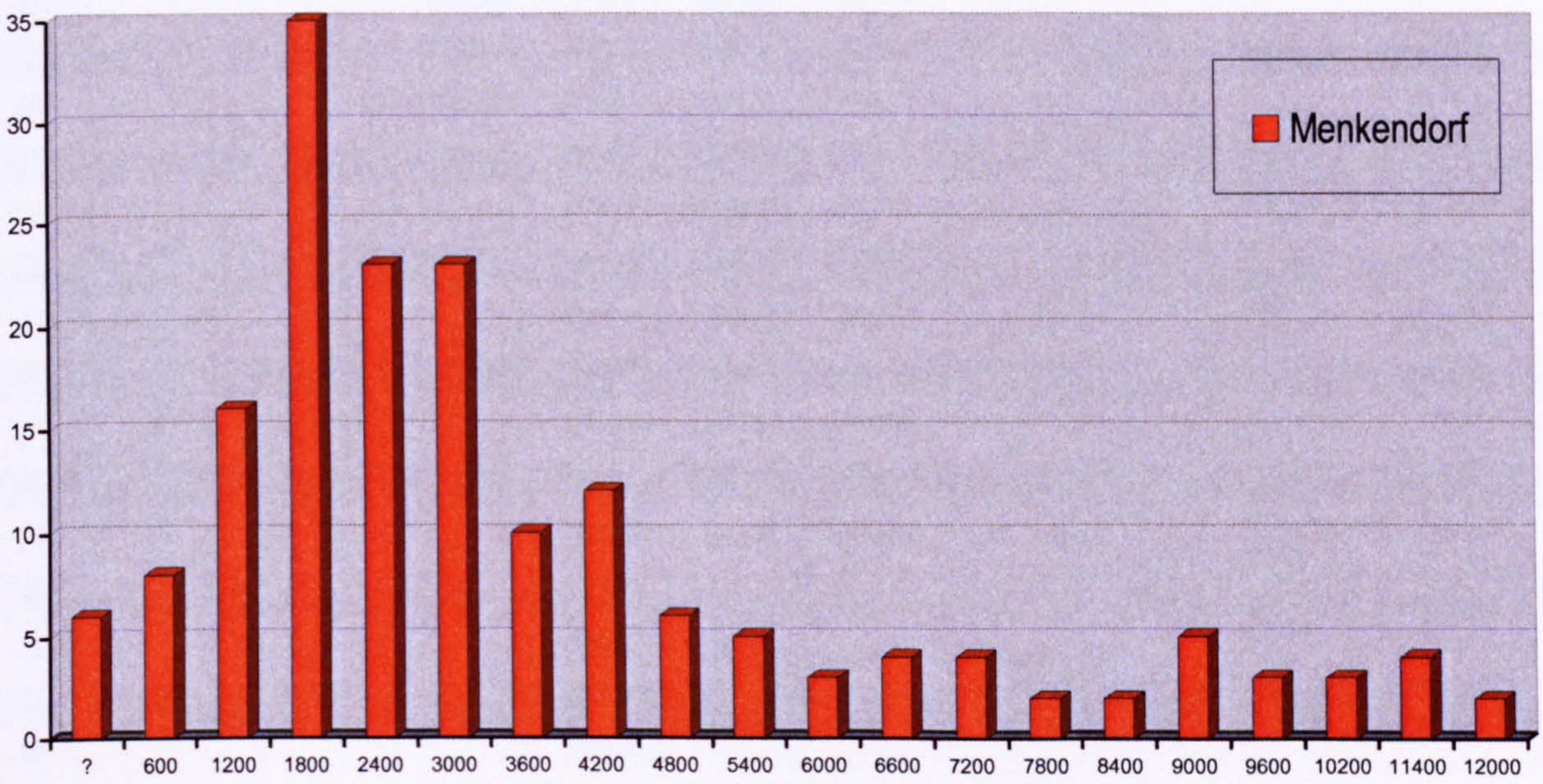

Fig. 41. Menkendorf type volumetric quantity

N° \ ml	?	600	1200	1800	2400	3000	3600	4200	4800	5400	6000
1	278.12	556.73	1139.64	1742.16	2361.58	2977.27	3563.32	4161.32	4742.12	5347.77	5975.36
2	323.08	598.67	1107.72	1746.90	2388.79	2982.29	3569.58	4147.45	4751.27	5347.92	5982.99
3	368.61	605.22	1176.83	1751.13	2354.28	2953.97	3562.43	4181.68	4777.28	5390.37	6016.06
4	392.98	613.69	1192.76	1761.01	2362.28	2963.62	3574.68	4184.07	4803.51	5446.24	
5	422.68	645.57	1195.45	1761.38	2370.75	2968.91	3582.17	4187.93	4822.28	5469.70	
6	441.20	666.72	1195.78	1765.35	2372.09	2973.53	3598.96	4233.11	4914.88		
7		671.31	1205.62	1767.77	2373.58	2974.00	3617.78	4238.19			
8		675.58	1224.47	1768.51	2375.09	2976.25	3667.48	4255.44			
9			1232.02	1771.13	2381.81	2980.15	3693.34	4271.14			
10			1235.74	1775.92	2385.38	2984.01	3702.10	4281.51			
11			1249.93	1776.55	2387.91	2984.29		4310.72			
12			1279.38	1778.90	2398.08	2987.89		4311.01			
13			1306.13	1779.22	2403.28	3008.34					
14			1306.73	1782.11	2417.10	3011.20					
15			1310.32	1786.61	2420.90	3023.23					
16			1329.07	1809.46	2424.64	3033.69					
17				1814.75	2453.58	3042.82					
18				1816.92	2456.25	3058.96					
19				1834.90	2485.88	3064.42					
20				1842.09	2488.27	3065.02					
21				1860.60	2509.37	3098.87					
22				1867.88	2541.48	3100.74					
23				1886.08	2549.08	3142.74					
24				1893.03							
25				1895.07							
26				1901.34							
27				1903.85							
28				1904.69							
29				1907.17							
30				1908.70							
31				1909.37							
32				1915.50							
33				1917.58							
34				1926.25							
35				1929.78							

N° \ ml	6600	7200	7800	8400	9000	9600	10200	11400	12000	12600
1	6537.46	7245.93	7772.99	8319.42	8834.92	9636.50	10152.74	11338.96	12064.58	12568.66
2	6557.25	7215.81	7830.33	8518.04	8911.25	9662.23	10175.19	11429.93	12151.94	
3	6579.95				8957.16	9692.98	10264.00	11435.85		
4	6595.96				8987.94			11530.53		
5					9071.30					

N° \ ml	13200	14400	16800	17400	19200	20400	27600	28200		44200
1	13126.51	14518.72	16828.32	17342.74	19175.87	20323.61	27555.97	28189.56	42500.85	44258.46
2	13364.28				19312.94	20426.48				
3						20466.87				
4										
5										

Fig. 42. Menkendorf type volumetric pattern

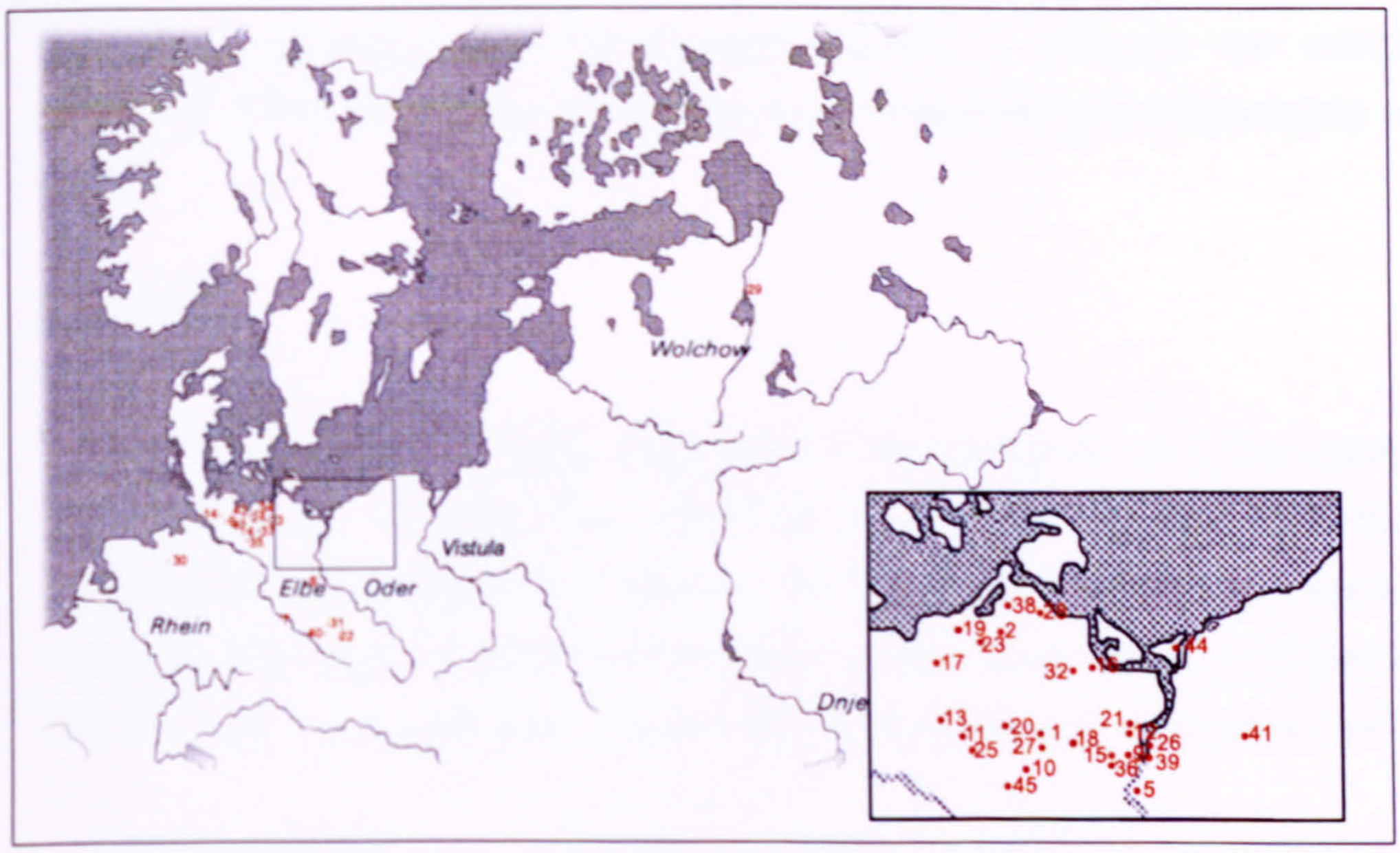

Fig. 43. Menkendorf type findspots

Menkendorf:
1. Alt Käbelich (Kr. Mecklenburg-Strelitz); **2.** Bad Sülze (Kr. Ribnitz-Damgarten); **3.** Berlin – Spandau; **4.** Bobzin (Kr. Lübz); **5.** Cedynia (Woj. Zachodnio – Pomorskie); **6.** Dümmer (Kr. Schwerin); **7.** Eulenau (Kr. Torgau); **8.** 'Fahrenhorst' – (Forst) (Kr. Lübz); **9.** Fahrenwalde (Kr. Pasewalk); **10.** Feldberg (Kr. Neustrelitz); **11.** Gaarz (Kr. Lübz); **12.** Gellin (Kr. Pasewalk); **13.** Gielow (Kr. Malchin); **14.** Goldenbow (Kr. Ludwigslust); **15.** Göritz (Kr. Prenzlau); **16.** Görke ot von Anklam (Kr. Anklam); **17.** Groß Raden (Kr. Sternberg); **18.** Hildebrandshagen (Kr. Strasburg); **19.** Kassebohm (Hansestadt Rostock); **20.** Klein Plasten (Krs. Waren); **21.** Löcknitz (Kr. Pasewalk); **22.** Lütjenberg (Kr. Calau); **23.**Marlow (Kr. Ribnitz); **24.** Mecklemburg; **25.** Minzow (Kr. Röbel); **26.** Mścięcino (Woj. Zachodnio – Pomorskie); **27.** Neubrandenburg (Kr. Neubrandenburg); **28.** Nienhagen (Kr. Straslund); **29.** Novgorod; **30.** Oldenburg (Kr. Ostholstein); **31.** Presenchen (Kr. Luckau); **32.** Ramelow (Kr. Neubrandenburg); **33.** Schönlage (Kr. Sternberg); **34.** Schwaan (Kr. Bützow); **35.** Schwaberow (Kr. Hagenow); **36.** Schwennenz (Kr. Pasewalk); **37.** Sudenhof (Kr. Hagenow); **38.** Sülze (Kr. Rostock); **39.** Szczecin – Mściecino (Woj. Zachodnio – Pomorskie); **40.** Tornow; **41.** Unimie (Woj. Zachodnio – Pomorskie); **42.** Warin (Kr. Wismar); **43.** Warin (Kr. Sternberg); **44.** Wolin (Woj. Zachodnio – Pomorskie); **45.** Wustrow (Kr. Waren)

Fresendorf

No pattern emerged from the Fresendorf material – although the numbers contained within the catalogue (17 pots were measured) are unfortunately very small.

Woldegk

No pattern emerged from the Woldegk material – although the numbers contained within the catalogue (15 pots were measured) are unfortunately very small.

Vipperow

Of the Vipperow pots, 173 were measured for the catalogue – and the pattern of standardisation is also very clear within this group (Figs. 44 – 46). Clusters are visible around the suggested multiples of the 600ml unit – and distinct gaps are clear between them. The greatest numbers of pots were between 1800ml and 3000ml; again, such pots would easy to handle and transport, even when full.

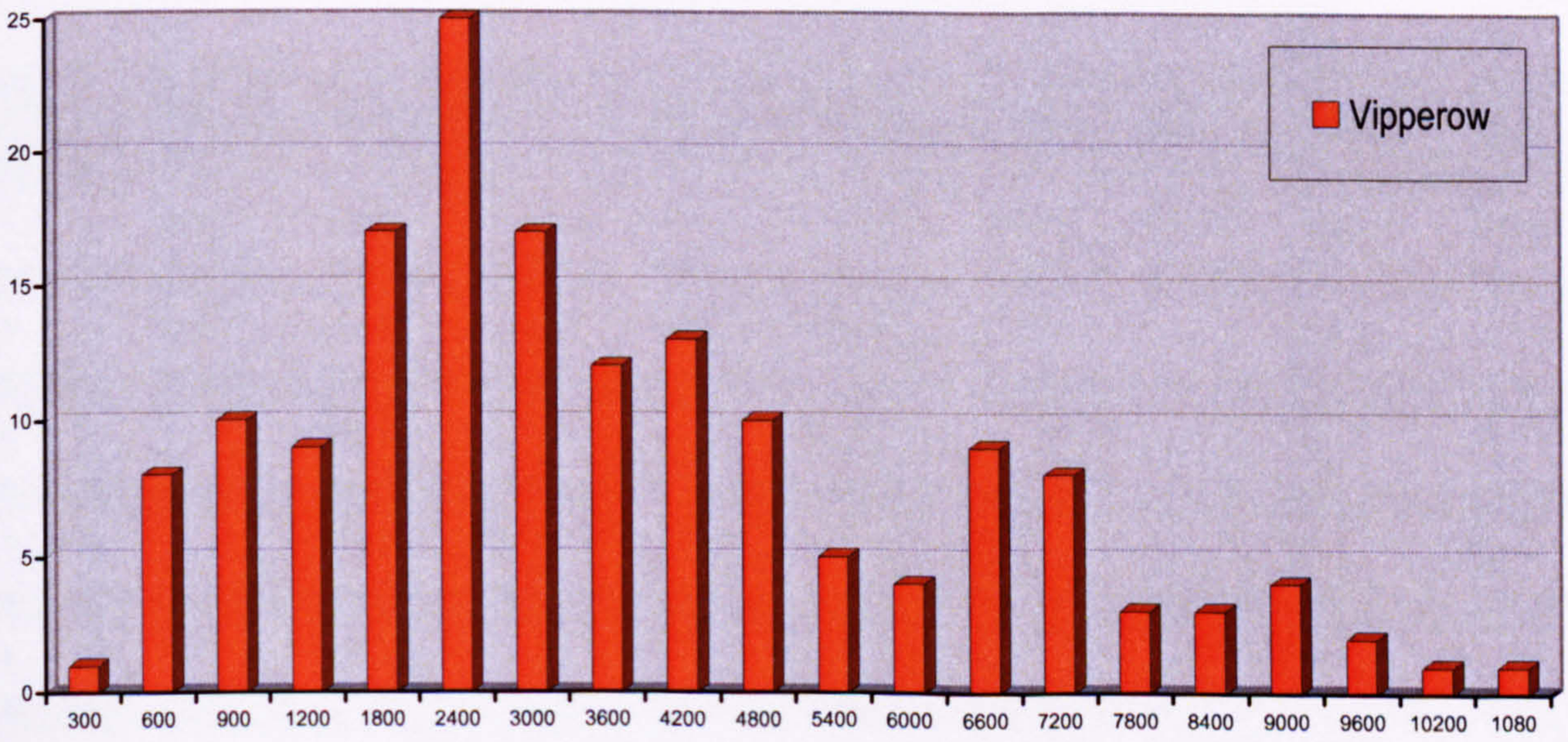

Fig. 44. Vipperow type volumetric quantity

N° \ ml	300	600	900	1200	1800	2400	3000	3600	4200	4800	5400
1	382.45	537.89	852.60	1160.41	1724.73	2330.34	2910.48	3512.51	4108.19	4499.45	5319.06
2		582.39	860.40	1161.41	1732.34	2332.23	2948.42	3513.11	4136.60	4699.99	5326.80
3		586.07	879.24	1209.57	1751.60	2332.45	2965.94	3532.65	4144.50	4715.91	5332.06
4		586.13	882.03	1230.77	1752.93	2340.93	2966.24	3533.82	4159.58	4716.81	5376.43
5		629.48	886.89	1249.43	1755.48	2360.62	2979.48	3557.93	4160.08	4739.43	5488.85
6		631.30	888.97	1250.04	1759.36	2372.32	2982.43	3567.15	4172.73	4755.64	
7		654.13	931.75	1279.06	1761.85	2379.99	2990.94	3592.88	4173.81	4854.04	
8		659.46	933.20	1314.58	1795.52	2381.57	2998.74	3616.40	4174.23	4863.98	
9			953.48	1338.13	1802.78	2391.59	3024.67	3629.89	4196.03	4884.65	
10			954.39		1813.08	2394.93	3025.22	3652.07	4199.47	4912.36	
11					1823.51	2401.52	3031.93	3666.16	4209.11		
12					1825.58	2409.61	3045.50	3695.82	4256.58		
13					1827.09	2424.37	3046.11		4258.72		
14					1868.84	2436.12	3055.94				
15					1884.47	2451.14	3086.72				
16					1904.08	2452.52	3099.37				
17					1904.76	2468.88	3112.22				
18						2479.51					
19						2484.29					
20						2488.91					
21						2499.03					
22						2499.47					
23						2501.61					
24						2524.56					
25						2529.59					

N° \ ml	6000	6600	7200	7800	8400	9000	9600	10200	10800
1	5930.90	6512.06	7114.72	7863.14	8416.23	8920.28	9560.14	10241.14	10720.92
2	5938.26	6516.38	7115.31	7898.45	8446.87	8988.65	9669.14		
3	5970.77	6527.49	7124.34	7917.47	8511.71	9026.47			
4	6115.40	6530.10	7140.01			9110.91			
5		6551.05	7150.75						
6		6579.08	7153.28						
7		6618.50	7153.92						
8		6639.92	7214.71						
9		6728.53							
10									

Fig. 45. Vipperow type volumetric pattern

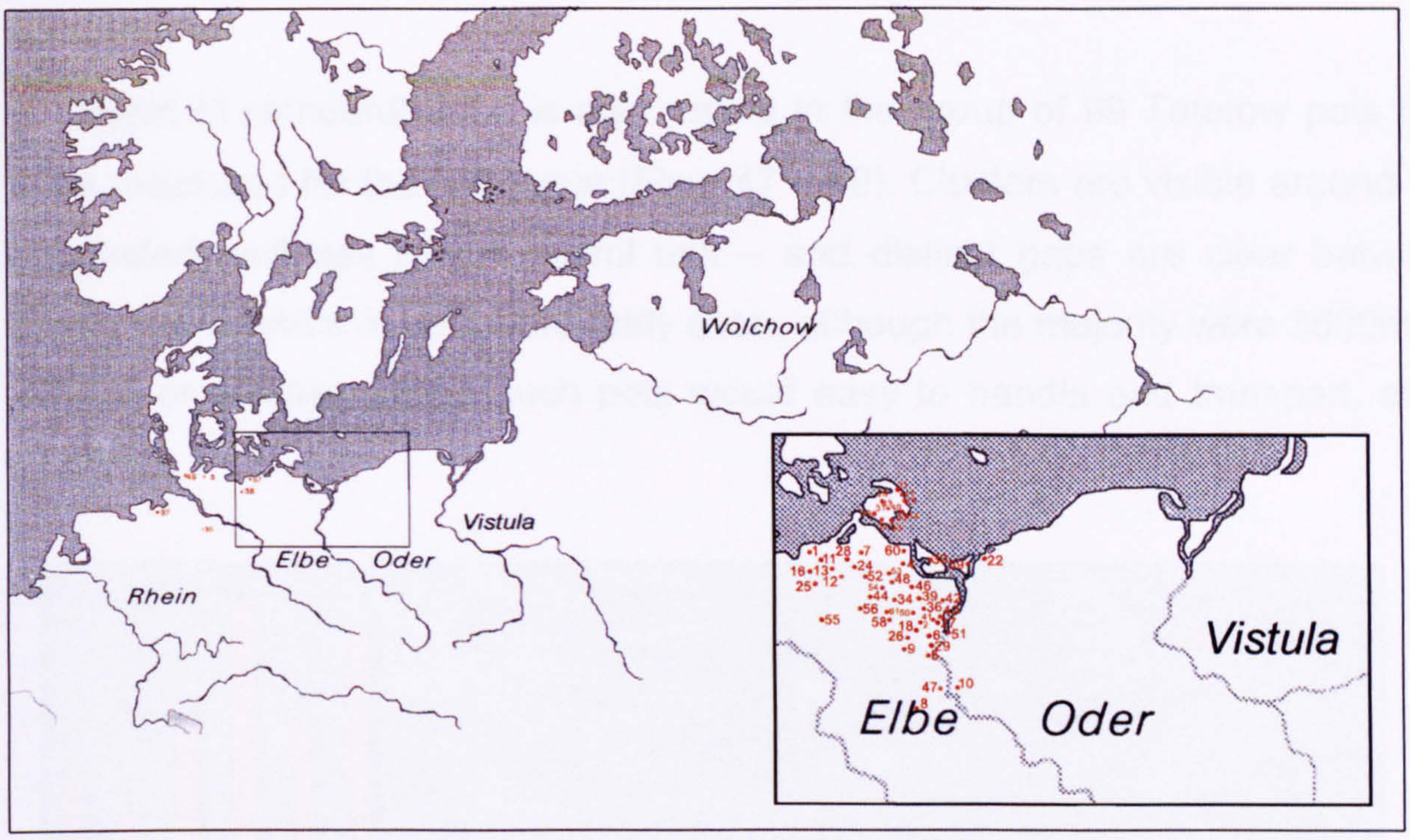

Fig. 46. Vipperow type findspots

Vipperow:
1. Alt Bartelsdorf (Kr. Rostock); **2.** Alt Käbelich (Kr. Mecklenburg-Strelitz); **3.** Alt Lübeck; **4.** Anklam (Kr. Anklam); **5.** Bagemühl (Kr. Anklam); **6.** Battin (Kr. Pasewalk); **7.** Behren-Lübchin (Kr. Güstrow); **8.** Berlin – Spandau; **9.** Cammin (Kr. Neubrandenburg); **10.** Cedynia (Woj. Zachodnio – Pomorskie); **11.** Damm (Kr. Rostock); **12.** Dinnies (Kr. Lübz); **13.** Dummerstorf (Kr. Rostock); **14.** Dummertewitz; **15.** Gem. Lancken-Granitz (Kr. Rügen); **16.** Finkenwerder (Kr. Lübz); **17.** Garftitz (Kr. Rügen); **18.** Groß Teetzleben (Kr. Altentreptow); 19. Gustow (Kr. Rügen); **20.** Jarnitz (Kr. Rügen); **21.** Jasmund (Kr. Rügen); **22.** Kamień Pomorski (Woj. Zachodnio – Pomorskie); **23.** Kowall (Kr. Rügen); **24.** Kützerhof (Kr. Malchin); **25.** Laschendorf (Kr. Waren); **26.** Lindow (Kr. Mecklenburg-Strelitz); **27.** Löcknitz (Kr. Pasewalk); **28.** Mecklemburg; **29.** Menkin (Kr. Pasewalk); **30.** Morgenitz (Kr. Wolgast); **31.** Nadelitz (Kr. Rügen); **32.** Natzevitz (Kr. Rügen); **33.** Neklade (Kr. Rügen); **34.** Neubrandenburg (Kr. Neubrandenburg); **35.** Neuenkirchen (Kr. Neubrandenburg); **36.** Neuhaus (Kr. Strasburg); **37.** Oldenburg (Kr. Ostholstein); **38.** Parchim (Kr. Parchim); **39.** Paselwak (Kr. Pasewalk); **40.** Ramin (Kr. Pasewalk); **41.** Rollwitz (Kr. Pasewalk); **42.** Rossow (Kr. Pasewalk); **43.** Rügen (Kr. Rügen); **44.** Sanzkow (Kr. Demmin); **45.** Schleswig; **46.** Schwanbeck (Kr. Neubrandenburg); **47.** Schwedt (Kr. Schwedt); **48.** Schwennze (Kr. Pasewalk); **49.** Serams (Kr. Rügen); **50.** Strasburg (Kr. Strasburg); **51.** Szczecin – Wzgórze Zamkowe (Woj. Zachodnio – Pomorskie); **52.** Teterow (Kr. Teterow); **53.** Tribsees (Kr. Straslund); **54.** Usadel (Kr. Neustrelitz); **55.** Vipperow (Kr. Röbel); **56.** Waren (Kr. Waren); **57.** Wendelstorf (Kr. Bad Doberan); **58.** Wolde (Kr. Altentrptowe); **59.** Wolin (Woj. Zachodnio – Pomorskie); **60.** Woserow (Kr. Anklam); **61.** Zachow (Kr. Neubrandenburg)

Teterow

A pattern of standardisation is also visible in the group of 99 Teterow pots that were measured for the catalogue (Figs. 47 – 49). Clusters are visible around the suggested multiples of the 600ml unit – and distinct gaps are clear between them. The clusters of pots were fairly even, although the majority were 3600ml in volume or smaller; again, such pots would easy to handle and transport, even when full.

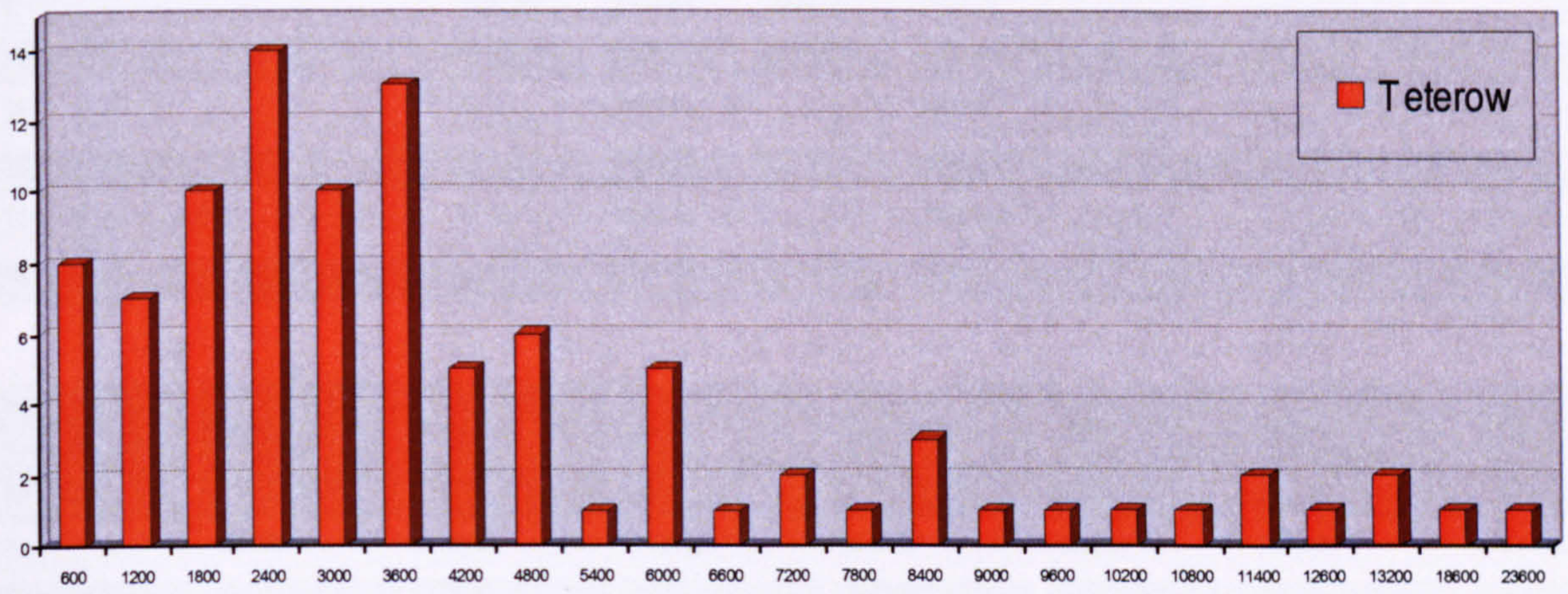

Fig. 47. Teterow type volumetric quantity

N° \ ml	600	1200	1800	2400	3000	3600	4200	4800	5400	6000
1	614.54	1149.61	1727.26	2335.92	2914.43	3543.30	4142.82	4722.03	5312.81	5919.58
2	636.09	1153.01	1789.39	2366.60	2927.79	3543.53	4174.41	4726.68		5993.18
3	653.28	1153.48	1789.97	2375.76	2954.63	3563.20	4290.44	4729.69		6121.95
4	671.88	1196.40	1790.65	2391.51	2956.70	3583.51	4309.54	4764.89		6142.40
5	673.81	1214.21	1879.74	2403.95	2956.81	3588.61	4311.73	4796.49		6167.99
6	688.75	1231.14	1902.18	2410.26	2957.26	3593.29		4923.94		
7	691.73	1276.95	1912.72	2410.27	2974.96	3595.69				
8	682.18		1921.57	2418.56	3029.84	3595.83				
9			1931.80	2453.20	3030.84	3621.97				
10			1939.82	2456.75	3038.01	3624.18				
11				2489.59		3673.45				
12				2494.74		3680.62				
13				2517.44		3698.10				
14				2521.83						

N° \ ml	6600	7200	7800	8400	9000	9600	10200
1	6661.94	7132.98	7788.66	8340.65	8986.66	9561.09	10214.28
2		7235.45		8403.99			
3				8459.71			
4							
5							

N° \ ml	10800	11400	12600	13200	18600	23600
	10949.03	11454.24	12712.67	13114.67	18597.27	23610.36
1		11472.85		13198.97		
2						
3						
4						
5						

Fig. 48. Teterow type volumetric pattern

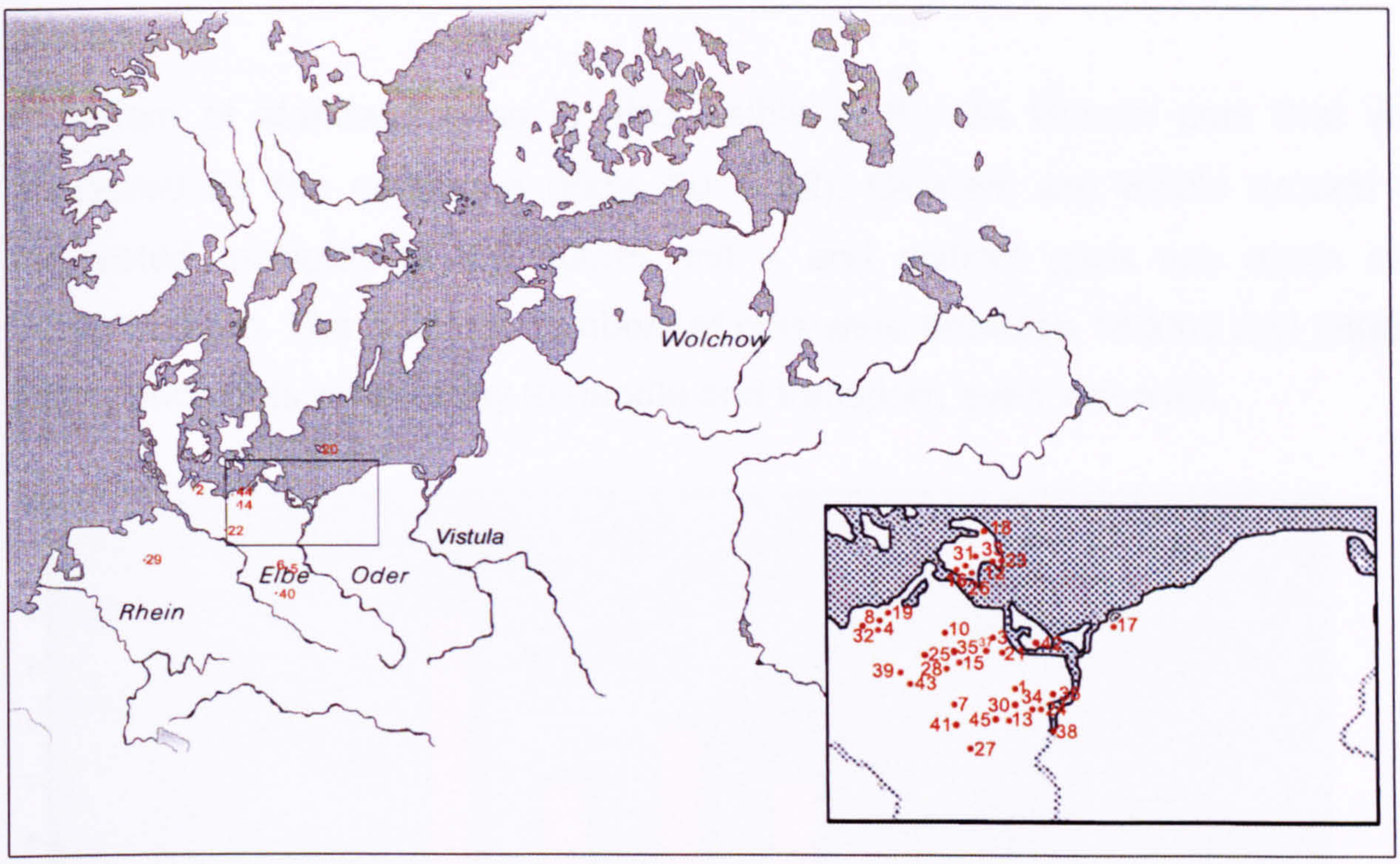

Fig. 49. Teterow type findspots

Teterow:
1. Alt Käbelich (Kr. Mecklenburg-Strelitz); **2.** Alt Lübeck; **3.** Anklam (Kr. Anklam); **4.** Behren-Lübchin (Kr. Güstrow); **5.** Berlin – Spandau; **7.** Grundstück Burgwall; **8.** Cammin (Kr. Neubrandenburg); **9.** Damm (Kr. Rostock); **10.** Darz (Kr. Rügen); **11.** Demmin (Kr. Demmin); **12.** Fordon; **13.** Garftitz (Kr. Rügen); **14.** Gellin (Kr. Pasewalk); **15.** Groß Raden (Kr. Sternberg); **16.** Groß Teetzleben (Kr. Altentreptow); **17.** Gustow (Kr. Rügen); **18.** Jarszewo (Woj. Zachodnio – Pomorskie); **19.** Jasmund (Kr. Rügen); **20.** Kassebohm (Hansestadt Rostock); **21.** Klemensker (Kr. Bornholm); **22.** Krien (Kr. Anklam); **23.** Lancken (Krs. Parchim); **24.** Lancken-Granitz (Kr. Rügen); **25.** Löcknitz (Kr. Pasewalk); **26.** Malkwitz (Kr. Waren); **27.** Natzevitz (Kr. Rügen); **28.** Neubrandenburg (Kr. Neubrandenburg); **29.** Neukalen (Kr. Malchin); **30.** Oldenburg (Kr. Ostholstein); **31.** Pasewalk (Kr. Prenzlau); **32.** Peseritz (Kr. Rügen); **33.** Rostock Stadtkern; **34.** Rügen (Kr. Rügen); **35.** Salzow (Kr. Pasewalk); **36.** Schwanbeck (Kr. Neubrandenburg); **37.** Schwedt (Kr. Schwedt); **38.** Schwennznz (Kr. Anklam); **39.** Szczecin – Wzgórze Zamkowe (Woj. Zachodnio – Pomorskie); **40.** Teterow (Kr. Teterow); **41.** Tornow "Borchelt" (Kr. Calau); **42.** Usadel (Kr. Neustrelitz); **43.** Usedom (Kr. Wolgast); **44.** Waren (Kr. Waren); **45.** Wendelstorf (Kr. Bad Doberan); **46.** Zirzow (Kr. Neubrandenburg)

Weisdin

No pattern emerged from the Weisdin catalogue – although the numbers contained within the catalogue (16 pots were measured) are unfortunately very small.

Bobzin

A pattern of standardisation is also visible in the 34 Bobzin pots that were measured for the catalogue (Figs. 50 – 52). Clusters are visible around the suggested multiples of the 600ml unit – and distinct gaps are again clear between them. The greatest numbers of pots were between 1800ml and 3600ml; again, such pots would easy to handle and transport, even when full.

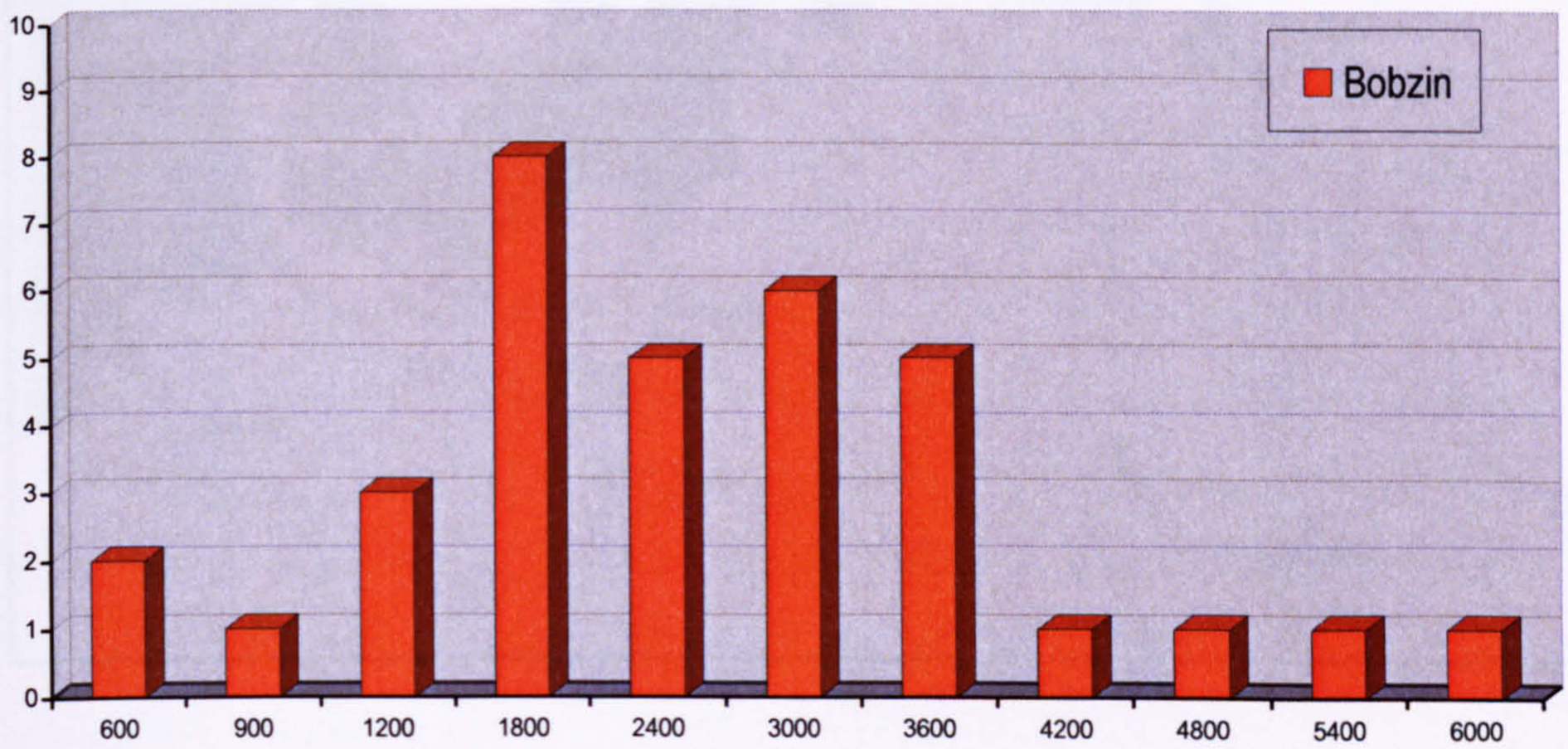

Fig. 50. Bobzin type volumetric quantity

N° \ ml	600	900	1200	1800	2400	3000	3600	4200	4800	5400	6000
1	725.20	967.59	1154.73	1725.32	2323.22	2946.51	3548.31	4166.01	4829.96	5371.92	5942.89
2	734.36		1299.66	1743.43	2369.65	2928.62	3601.00				
3			1370.80	1744.70	2406.76	3018.88	3654.96				
4				1763.57	2485.98	3080.40	3694.86				
5				1776.43	2469.13	3110.47	3737.96				
6				1788.43		3113.62					
7				1792.88							
8				1912.31							

Fig. 51. Bobzin type volumetric pattern

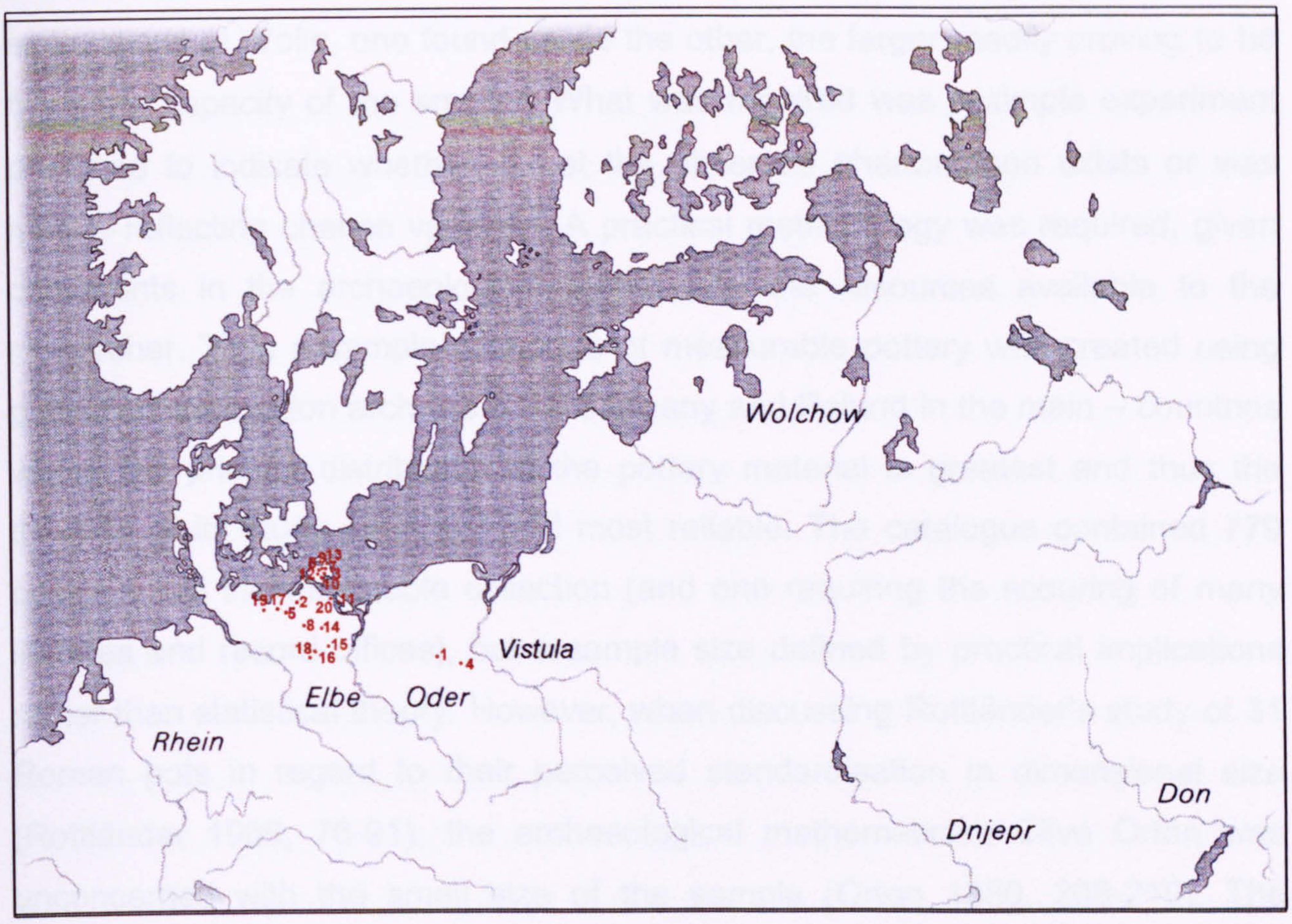

Fig. 52. Bobzin type findspots

Bobzin:

1. Alt Ruppin (Fst.2) (Kr. Neuruppin); **2.** Behren-Lübchin (Kr. Güstrow); **3.** Bergen (Kr. Rügen); **4.** Berlin – Spandau; **5.** Bobzin (Kr. Lübz); **6.** Dumgenewitz (Kr. Putbus); **7.** Jasmund (Kr. Rügen); **8.** Jasmund (Kr. Bergen); **9.** Küsserow (Kr. Teterow); **10.** Küsserow (Kr. Teterow); **11.** Pulitz (Kr. Rügen); **12.** Putbs (Kr. Rügen); **13.** Quilitz (Kr. Wolgast); **14.** Rügen (Kr. Rügen); **15.** Scharpitz (Kr. Putbus); **16.** Schwanbeck (Kr. Neubrandenburg); **17.**Stargard (Fst.14) (Kr. Neubrandenburg); **18.** Teterow (Kr. Teterow); **19.** Thelkow (Kr. Rostock); **20.** Vipperow (Kr. Röbel); **21.** Wendorf (Kr. Güstrow); **22.** Wolgast (Kr. Wolgast)

The use of weights and weight systems has long been attested in the Viking Age. This investigation has suggested that pottery standardisation occurred within the Feldberg, Menkendorf, Vipperow, Teterow and Bobzin types of Western Slavonic pottery. Distinct groups are visible within the material culture studied, perhaps indicating evidence of a measurement system. The Feldberg, Menkendorf, Vipperow, Teterow and Bobzin types of pottery broadly span the period between the mid 8th century AD and the 12th century AD. The standardisation may indicate their use in the storage and transportation of a traded foodstuff – such as salt or honey.

The experiment was designed as an exercise in hypothesis testing (Orton 1980, 203). That possible standardisation could be identified in early medieval Western

Slavonic pottery was suggested to the author by two pots recovered from excavations at Wolin, one found inside the other, the larger readily proving to be twice the capacity of the smaller. What was required was a simple experiment designed to indicate whether or not the observed phenomenon exists or was merely reflecting chance variation. A practical methodology was required, given constraints in the archaeological record and the resources available to the researcher. Thus a sample catalogue of measurable pottery was created using published excavation archives from Germany and Poland in the main – countries where the primary distribution of the pottery material is greatest and thus the tradition of its study strongest and most reliable. The catalogue contained 779 pots – a not inconsiderable collection (and one requiring the scouring of many libraries and record offices), but a sample size defined by practical implications rather than statistical theory. However, when discussing Rottländer's study of 31 Roman pots in regard to their perceived standardisation in dimensional size (Rottländer 1966, 76-91), the archaeological mathematician Clive Orton was unconcerned with the small size of the sample (Orton 1980, 208-210). The catalogue prepared for this thesis is large enough to well-represent the pottery concerned – and to alleviate fears in regard to errors contained within the published material, its distribution and imbalances contained within its collection.

The attempt to interpret the perceived archaeological phenomenon of standardisation within Western Slavonic pottery required a preceding hypothesis test in order to establish its validity objectively. By constructing a large sample catalogue and establishing the individual volumes it has been possible to test the validity of the theory – further physical research would be required to prove the validity of the phenomenon. The volumetric information was derived from measurements taken from the page rather than from the pots themselves – requiring an acceptance of all the assumptions and dangers which that entails. This was a necessity due to resource constraints, but not one which invalidates the study. Orton notes that "the statistical technique of hypothesis testing can be a useful tool in the attempt to establish a phenomenon as worthy of interpretation and in suggesting areas where further work might be needed" (1980, 214). This thesis has successfully tested the hypothesis and can now set the interpretation into its wider chronological, regional and functional contexts.

Conclusion

The main thread running through the study of the growth of towns and trade in the Baltic region during the early medieval period or Viking Age is the trading network itself. Between the 9th and 11th centuries AD an area including Scandinavia and central and Eastern Europe can clearly be described as one zone of exchange, with the Baltic Sea as the axis of trade. The development of this trade network owed much to the influence of the Islamic world – an influence most readily visible in the distribution of the silver Arabic dirham within the archaeological record, but also in the use of an Islamic-inspired weight system. The region eagerly embraced the dynamic economic strength of the Caliphate – and Islamic notions of trade (enshrined within religion, law and society) and the importance of measured standards were clearly transferred. The "*measures of capacity*" described by the 15th century Egyptian historian Al-Maqrizi (see Chapter Four) were of equal importance to the weight system within the Islamic market place; the use of systemic standardised vessel volumes could have arrived in the Baltic region alongside the Arabic silver and the Islamic-influenced weight system. This thesis has explored further archaeological and historical evidence of standardisation within the trading networks of the early medieval period of the Baltic Sea region, focussing particularly upon the possible standardisation of measures within contemporary Western Slavonic pottery.

Gustin noted that the early Baltic towns "are sites where there were several different types of exchange: both politically motivated and controlled commodity exchange and trade for personal profit. The occurrence of standardised weights and scales together with high-quality silver in the Baltic Sea region suggests that some market trade took place" (2004, 268). The growth of towns is intrinsically linked to the opening of the trade routes along the 'northern arc' from the Baltic Sea, along the Russian river systems to Byzantium and, in particular, the Islamic world. During the 9th and 10th centuries, Arabic silver flooded into the Baltic: some have speculated that there were millions of silver dirhams in the regions that now form Russia, Poland and Scandinavia during

this period (Howard-Johnston 1998, 66); and there is evidence that the silver arrived very quickly, with often little time lag between the striking of a dirham and its deposition in European Russia (Noonan 1988, 413). The silver was exchanged for fur, a luxury commodity in great demand in the Islamic world. The Caliphate was capable of absorbing huge quantities of furs and paying high prices for them – and the 'northern arc' supplied the Islamic world with the furs that they desired. The theoretical background to the growth of towns and trade in the Baltic region was discussed in detail in Chapter Two, alongside a discussion concerning the theory and concepts relevant to the archaeological study of early medieval economic systems in general. This allowed the following chapter to describe the regional detail of Baltic towns and trade – and of the 'northern arc' and its protagonists – within the context of contemporary European and Islamic trade networks and commerce.

Scandinavian merchants were the middlemen between the Slavonic hunters and trappers of the forests of the north and the Muslim merchants from the cities of the south. Just as the wealthy elites of the Caliphate craved furs, the Scandinavians craved silver. Social position, alliances and status during the Viking Age were reflected in gift-giving. It was an important element within Viking society and required the constant acquisition of wealth. Trade went hand in hand with raiding – and the associated developments included the growth of towns, local barter-based trade (such as the gathering of furs from a wide hinterland), long distance trade, the stimulation of socio-political change and the appearance of a distinct merchant class. The merchants have been described as "a class set apart from the normal native population: they were richer, more eclectic in their absorption of foreign traditions and accumulation of personal possessions. They probably were members of a semi-independent and supra-national group responsible only to the king or administrator of the town in which they were living or trading at any given time" (Clarke and Ambrosiani 1995, 175). This thesis has explored the archaeological and historical evidence of this merchant class, particularly focussing on evidence of standardisation within the methods and commodities of trade. Information regarding such standardisation can realise insights concerning the practices of this merchant class and their various social relationships.

During the course of the early medieval period in the Western Slavonic lands of the southern Baltic coast, the development of the local, regional and supra-regional social elites acted as a stimulator to the growth of a number of branches of industry and trade and to increasing specialisation (Wyrozumski 1983, 248). Over the course of the 9th century the craft production at the Baltic trading places became more standardised – the number of variations in comb types decreases for example (Callmer 1992, 140). The typological study of the goods of craft production (such as combs, beads and jewellery) was not relevant to this thesis, which sought to identify less tangible metrological standardisation within trade and exchange. That individual goods (combs for example) were manufactured for trade over a long distance is not in doubt – but the widespread use of accepted standards indicates much more than common wants or needs. The widespread use of set standards such as a weight system or a recognised series of measurement units implies a commonality in understanding, of agreed method or accepted value. Individual goods (such as a comb) are worth whatever the recipient feels it is worth or what the agent of transfer is willing to exchange it for. Set systemised standards are indicators of a much wider social framework.

Contemporary early medieval European historical sources describe many instances of standardisation within the products of the natural world (such as grain or salt), particularly in regularised amounts of tithe and taxes. Evidence of standardisation is visible within the archaeological record and was described in Chapter Four. Iron was traded in regularised bars or ingots such as the Scandinavian *vaerjern* or Slavonic *grzywny*. However, the main evidence for metrological trading standardisation within the Baltic Viking Age is the widespread use of common weight systems. Balances and standardised sets of weights are typical finds, indicative of a weight-based monetary system. They were used in long-distance trade and, as a result, by everyone in associated markets or areas of transactions (Steuer 1997, 441). While weights and balances would have been used in other instances – the craftsman weighing his metals prior to alloying for example – it is the standardised nature of the system that promotes reflection.

The hypothesis that naturally follows this phenomenon – that if weight systems existed for precious metals, they are likely to exist elsewhere, concerning other goods – has been investigated throughout this thesis. Further archaeological, historical and iconographical evidence of trading standardisation was explored, such as other forms of wealth accumulation (iron, honey, salt and furs, for example) and the standardisation or regularisation of pottery volumes and measurements of cloth. Excluding the metrological trading standardisation employed by the weights and weights systems in use, the main evidence for standardisation visible within the archaeological record of the Baltic Viking Age is the iron traded in regularised bars or ingots such as the Scandinavian *vaerjern* or Slavonic *grzywny*. The basic premise of the discussions was that trade systemisation (rather than infrequent, opportunistic trade) prompted the centralisation of trade and the growth of trade standardisation. This sequence is difficult to identify in the archaeological and historical record but is not an unlikely scenario. With regularised trade, geographical centralisation occurred, visible in phenomena such as early towns. These geographical centres appeared for a variety of reasons, such as proximity to a resource (such as Kołobrzeg, situated close to major salt pans); foundation by an existing authority (such as Hedeby); geographical convenience (such as Wolin, situated at the mouth of the Oder) or the presence of earlier settlement (such as the hillfort of Ryurik Gorodishche, the precursor to Novgorod, which was an administrative, trading and craft-production centre for the surrounding network of Slavonic rural settlements (Nosov 1992; Nosov 1994) or Ribe, situated upon the site of an earlier beach market). Such centralisation of authority can be argued as the cause of many elements of trading standardisations (as authority sought control in order to acquire greater wealth). However, trade standardisation is also a natural result of trade systemisation. The main factors within early medieval trade – systemisation, centralisation and standardisation – do not necessarily beget one another, although the systemisation of trade would certainly appear to precede standardisation.

Most pottery studies are usually typological and chronological in nature, not functional. Indeed, of the 'big three' studies identified by Orton et al – using pottery to obtain dating evidence, distributional evidence or evidence for function

or status – function is generally recognised as the most neglected (1993, 28). This thesis has used Western Slavonic pottery to highlight another aspect of the archaeological and historical evidence for measurement systems and standardisation. Chapters Five, Six and Seven described the successful 'hypothesis test' (Orton 1980, 203), proving that there was standardisation within the Feldberg, Menkendorf, Vipperow, Teterow and Bobzin types of Western Slavonic pottery. These types of pottery broadly span the period between the mid 8th century AD and the 12th century AD and are found in large quantities throughout the Baltic rim.

As described in Chapter Six, the method used to quantify the volumes (and thus allow a study of standardisation and measurement systems) was to digitise the vessel profile using AutoCAD (taking the profiles from published excavation catalogues) and then use the improved 'summed cylinders' mathematical formula to calculate the volume. A large number of published excavation reports were checked, only a number of which contained the illustrated and scaled pottery that now form the basis of the catalogue described in the previous chapter (and included as an appendix). The excavations included within the catalogue are too numerous to list, but those that provided more than the usual solitary pot include investigations at Birka, Groß Raden, Mecklenburg, Menzlin, Oldenburg, Rügen, Szczecin and Wolin. This practical desk-based methodology was required, given constraints in the archaeological record and the resources available to the researcher. Thus a sample catalogue of measurable pottery was created using published excavation archives from Germany and Poland in the main – countries where the primary distribution of the pottery material is greatest and thus the tradition of its study strongest and most reliable. The catalogue contained 781 pots – a not inconsiderable collection (and one requiring the scouring of many libraries and record offices), but a sample size defined by practical implications rather than statistical theory. However, when discussing Rottländer's study of 31 Roman pots in regard to their perceived standardisation in dimensional size (Rottländer 1966, 76-91), the archaeological mathematician Clive Orton was unconcerned with the small size of the sample (Orton 1980, 208-210). Similarly, when undertaking a study of the relationship between vessel form and vessel function within the Iron Age pottery from the settlement mound at Ginderup,

Denmark, Juhl was content with a sample size of only 123 whole or partial vessels (Juhl 1995, 48). The catalogue prepared for this thesis was large enough to well-represent the pottery concerned – and to alleviate fears in regard to errors contained within the published material, its distribution and imbalances contained within its collection.

The volumetric information was derived from measurements taken from the pages of excavation reports rather than from measuring the pots themselves. Although this required the author to accept the risks entailed in such a study – including assumptions that that the reproduction scales were correct, for example, or that the ceramic vessels were originally symmetrical around an axis running through the centre of the base and orifice – this was necessary due to resource constraints. However, such an acceptance does not invalidate the study. Orton notes that "the statistical technique of hypothesis testing can be a useful tool in the attempt to establish a phenomenon as worthy of interpretation and in suggesting areas where further work might be needed" (1980, 214). This thesis has successfully tested the hypothesis and can now set the interpretation into its wider chronological, regional and functional contexts.

The standardisation may indicate their use in the storage and transportation of a traded foodstuff – such as salt or honey. That such foodstuffs be traded is not surprising, for both salt and honey were of great importance in the early medieval kitchen. Neither is it surprising that the storage and transportation of such foodstuffs should occur in small containers, middle-sized containers and even large containers. What is of great importance is the discovery of the likelihood of the trade of such containers taking place within set standards of measurement.

Following the creation of the catalogue described in the previous chapter, the basic unit of 600ml was immediately apparent. The rough groupings (where numbers of pots formed 'clusters' around certain sizes, with distinct gaps forming between) and the distinct clusters around multiples of three (1800ml and 3600ml) and of associated units in between (particularly 2400ml) were clear. The pottery was not manufactured and traded as simply 'little' and 'large', or even as a standardised 'little' and a standardised 'large'. It was manufactured and traded as

part of a system where a standardised 'little' was a half or a third or a quarter the size of a standardised 'large'. Such a standardised measurement system also implies common perceptions of value and suggests a hitherto unknown degree of sophistication to at least one element in the supply chain. Even if only the merchant class 'understood' or used the standardised measurement system, the system still required implementation at initial manufacture – a greater level of sophistication than that required by the widespread use of Islamic-inspired weight systems.

Over time, the increasing complexity of social organisation within the Baltic zone of exchange can be seen to mirror the increasing complexity of trade systems and of settlement patterns. The social implications of this mercantile activity and of the growth of towns in the southern Baltic region occupied by the Western Slavs are particularly interesting. The early medieval tribes of the Western Slavs (the Polabian Obodrites and Veleti and the many Pomeranian tribes) developed strong intertribal links and witnessed the successful growth of towns and trading communities – prior to the traditional feudal indicators of kings and vassals, coinage and Christianity. The trading settlements that were established on the southern Baltic coast flourished, the successful trade indicated by the concentration of wealth visible in the silver hoards of the region – and by finds such as those of the three 9th or 10th century Slavonic ships from Ralswiek (Meier 2006, 31). The many strongholds visible in the late 9th century settlement record and their regular spatial distribution over Pomerania in particular (an area where settlement had previously been irregular) also seem to indicate the formation of some form of centralised socio-political structure. This pattern is also seen in Polabia, where a number of large densely occupied multivallate hill forts were built (Barford 2001, 106).

The Bavarian Geographer was written in the mid 9th century AD and can be used to illustrate the social structure of the Western Slavs (Lubke 1997, 121). The Western Slavs were described in terms of the political categories of *civitas* (basically individual clan strongholds, varying in respect to their size and relations with surrounding open settlements) and *regio* (larger tribal strongholds, superior to the *civitates*). The rulers of these tribes would seem to

have been a confusing mixture of powerful leaders, hereditary dynasties and elected representatives of the clans and tribes. The clan *civitas* each had a leader known as *primores*. The *primores* formed the *populus* which had influence over the *regio*, headed by a prince. The historical sources show that "the settlement-communities [of the Polabian Obodrites and Veleti in the 9th century] developed their influence over the highest political level, and in turn, they were subordinated to the central authority only to a certain extent (in the case of defence)...The Polabians [and likely the Pomeranians] in the 9th century had rather a political system, which may easily be described as a society without a state" (Lubke 1997, 121).

The presence of strong Western Slavonic tribes necessitated the creation in the 9th century of Charlemagne's *limes Saxoniae* – and the violence of the later 10th century territorial warfare (when compared with similar action in the regions now comprising Austria, Bohemia and Hungary) indicates the difficulties the Franks faced (Barford 2001, 258). The Franks annexed most of Polabia during a series of mid 10th century campaigns, only to see their territorial gains reversed by an uprising by the Veleti (or Lutize) Union in AD 982-3. The Veleti Union was a regional tribal confederation of the Western Slavs, strong enough (until its collapse in the AD 1050s) to withstand the Frankish Empire. It illustrates the complexities of the social organisation and development of the Western Slavs, development stimulated by their role in regional trade. Current theories concerning the role of feudalism in the growth of towns and trade prove inadequate when used in the study of the rapidly accelerating social and economic structures of the Western Slavs. The Baltic Sea region proved ripe for rapid economic and social development, influenced by the reach and dynamic economic strength of the Caliphate. Western Europe by contrast was stagnant; the merchant class provided by the widespread Jewish cultural network. The rise of the Jewish merchant during the Carolingian period was both a result of their taking an increased role in a diminished market and as a result of hostilities between Muslims and Christians (Bachrach 1977, 72). Jewish merchants linked two hostile spheres of influence, while Viking and Western Slavonic society benefited directly. Indeed, the active role of the Western Slav

within the regional Baltic economy is at odds with the unfortunate fate often supposed of the Slav as the victim within the greater European slave trade.

The archaeological study of the early Slavonic and Germanic peoples has, historically, been dominated by nationalistic desires in regard to ethnogenesis and territory, while the study of the Vikings has all too often been colonialist in nature, focussed upon the Scandinavians and their actions rather than their effect on 'native' peoples. The legacy of Kossina has haunted wider northern European archaeological studies of the period, modern investigators almost fearful of looking over their borders and suggesting broader interactions and influences. As a result, the Baltic Sea has been simply regarded as a Viking *mare nostrum*, the comparative size and importance of the 'big three' – Birka, Hedeby *and* Wolin – often ignored. The relative wealth, regional status and interaction within trade enjoyed by the Polabian and Pomeranian Slavs have, I hope, been highlighted in this thesis. The large amounts of silver found hoarded around Wolin and in the Pomeranian region can be compared to those found around Birka and Hedeby; the very size of the early town and its port (and the historical reports by travellers such as Ibrahim ibn Yaqub) confirm the status of Wolin to be comparable to Birka and Hedeby; while the likely standardisation of some types of the widespread Western Slavonic pottery indicated by this study may be interpreted as evidence of a Slavonic role within regional trade. Foodstuffs such as honey or salt, originating in the inland forests and coastal salt pans respectively, may have been widely traded. Indeed, the Arabic silver dirhams found in the Polabian, Pomeranian and Prussian regions of the southern Baltic coast began to arrive at the beginning of the 9th century (Bartczak 1997, 229), within the earliest phase of Arabic silver penetration into northern Europe (Noonan 1997, 147); the active participation of the Western Slavs within the developing trading networks around the Baltic Sea was obviously present from the outset.

The complete pottery catalogue

Nº	Site	Vessel type	Volume ml/cm³	Location	Notes
1	Wolin W.2 f.19 Woj. Zachodnio – Pomorskie	Vipperow	2468.88	Settlement (port area)	Nr. 260 w-wa.A ćw.V One vessel in the another – Bigger Unpublished
2	Wolin W.2 f.19 Woj. Zachodnio – Pomorskie	Vipperow	1250.04	Settlement (port area)	Nr. 260 w-wa.A ćw.V One vessel in the another – Unpublished
3	Wolin St. 4 Woj. Zachodnio – Pomorskie	Menkendorf	1768.51	Settlement (town)	Białęcka 1961 Tab. XV/ 6 Cnotliwy *et al.* 1986 Ryc.7/2
4	Wolin St. 4 Woj. Zachodnio – Pomorskie	Fresendorf	3738.50	Settlement (town)	Białęcka 1961 Tab. VIII/4 Cnotliwy *et al.* 1986 Ryc.5/9
5	Wolin St. 4 Woj. Zachodnio – Pomorskie	Menkendorf	605.22	Settlement (town)	Białęcka 1961 Tab. XV/3 Cnotliwy *et al.* 1986 Ryc. 7/1
6	Wolin St. 4 Woj. Zachodnio – Pomorskie	Feldberg	9615.64	Settlement (town)	Białęcka 1961 Tab. XI/1 Cnotliwy *et al.* 1986 Ryc. 8/1
7	Wolin St. 4 Woj. Zachodnio – Pomorskie	Menkendorf	4914.88	Settlement (town)	Białęcka 1961 Tab. XII/1 Cnotliwy *et al.* 1986 Ryc. 6/1
8	Wolin St. 4 Woj. Zachodnio – Pomorskie	Fresendorf	1576.07	Settlement (town)	Białęcka 1961 Tab. XII/4 Cnotliwy *et al.* 1986 Ryc. 5/12
9	Wolin St. 4 Woj. Zachodnio – Pomorskie	Menkendorf	44258.46	Settlement (town)	Białęcka 1961 Tab. X/4
10	Wolin St. 4 Woj. Zachodnio – Pomorskie	Menkendorf	13364.28	Settlement (town)	Białęcka 1961 Tab. X/5 Cnotliwy *et al.* 1986 Ryc. 6/8
11	Mścięcino St.1 Woj. Zachodnio – Pomorskie	Menkendorf	4281.51	Settlement	Muzeum Narodowe in Szczecin MNS A/11.583a (W/70/54)
12	Unimie Woj. Zachodnio – Pomorskie	Menkendorf	1929.78	?	Muzeum Narodowe in Szczecin MNS A/8626 (W/918/1945)
13	Szczecin – Mścięcino Woj. Zachodnio – Pomorskie	Menkendorf	6016.06	Settlement	Garczyński 1957 Tab. XXII/2
14	Szczecin – Mścięcino Woj. Zachodnio – Pomorskie	Menkendorf	5390.37	Settlement	Garczyński 1957 Tab. XXII/3
15	Cedynia St.1 Woj. Zachodnio – Pomorskie	Menkendorf	2549.08	Settlement	Muzeum Narodowe in Szczecin MNS/A/9.685 (W/ 374/1959)
16	Cedynia Woj. Zachodnio – Pomorskie	Vipperow	4755.64	Settlement	Muzeum Narodowe in Szczecin MNS A/9690 (W/ 373/1959)
17	Wolin St. 5 Woj. Zachodnio – Pomorskie	Vipperow	3112.22	Settlement (town)	Cnotliwy *et al.* 1986 Ryc. 31/7
18	Oldenburg Kr. Ostholstein	Menkendorf	2370.75 2338.05	Settlement (fortified)	Kempke 1984a Taf. 9/7 Kempke 1984c Abb. 25/12 Müller-Wille 1991 Abb. 21/4
19	Wolin St.1 W.6 Woj. Zachodnio – Pomorskie	Fresendorf	3124.27	Settlement (town)	Cnotliwy et al. 1986 Ryc. 15/8
20	Wolin St.1 W. 6 Woj. Zachodnio – Pomorskie	Fresendorf	4989.74	Settlement (town)	Unpublished Nr. Inw. 654
21	Görke Kr. Anklam	Sukow	2600.22	Settlement	Faust *et al.* 1979 Taf. 49/55/6 Dulinicz 2001 Ryc.13/4
22	Steutz Stara Marchia	Prag	3684.04	Settlement	Faust *et al.* 1979 Taf. 37/54 Dulinicz 2001 Ryc.10/7
23	Szczecin – Wzgórze Zamkowe Woj. Zachodnio – Pomorskie	Vipperow	5332.06 5393.69	Settlement (town)	Cnotliwy *et al.* 1983 Ryc. 40/3
24	Oldenburg Kr. Ostholstein	Teterow	2517.44 2575.33	Settlement (fortified)	Kempke 1984a Taf. 17/10 Kempke 1984c Abb. 28/7
25	Helgö	Feldberg	2962.66	Settlement	Brather 1996 Taf. 39/9
26	Oldenburg Kr. Ostholstein	Menkendorf	3702.10 3718.74	Settlement (fortified)	Kempke 1984a Taf. 34/4
27	Oldenburg Kr. Ostholstein	Menkendorf	3693.34 3698.79	Settlement (fortified)	Kempke 1984a Taf. 34/3
28	Oldenburg Kr. Ostholstein	Menkendorf	2973.53 2959.86	Settlement (fortified)	Kempke 1984a Taf. 34/5

29	Birka	Feldberg	1271.36	Burial (grave 326)	Brather 1996 Taf. 38/1
30	Szczecin – Wzgórze Zamkowe Woj. Zachodnio – Pomorskie	Vipperow	1825.58 1860.63	Settlement (town)	Cnotliwy *et al.* 1983 Ryc.136/4
31	Szczecin – Wzgórze Zamkowe Woj. Zachodnio – Pomorskie	Teterow	1939.82 1915.37	Settlement - town	Cnotliwy *et al.* 1983 Ryc. 136/1
32	Oldenburg Kr. Ostholstein	Vipperow	2488.91 2410.56	Settelment – Burgwall	Kempke 1984a Taf. 17/11 Kempke 1984c Abb. 28/5 Mülle-Wille 1991 Abb. 23/10
33	Strasburg Kr. Strasburg	Feldberg	6529.59	Settlement – Siedlung	Brather 1996 Taf. 31/1
34	Strasburg Kr. Strasburg	Feldberg	1773.23	Settlement – Siedlung	Brather 1996 Taf. 31/7
35	Oldenburg Kr. Ostholstein	Menkendorf	1746.90	Settelment – Burgwall	Kempke 1984a Taf. 35/4
36	Oldenburg Kr. Ostholstein	Menkendorf	2403.28	Settelment – Burgwall	Kempke 1984a Taf. 34/6 Mülle-Wille 1991 Abb. 21/3
37	Sternberger Burg Kr. Sternberg	Feldberg	3661.67	Settlement – Burgwall	Brather 1996 Taf. 29/8 Schuldt 1983 Abb.26/a
38	Sternberger Burg Kr. Sternberg	Feldberg	3716.61	Settlement – Burgwall	Brather 1996 Taf. 29/9 Schuldt 1983 Abb.25/a
39	Oldenburg Kr. Ostholstein	Sukow	4447.18 4411.52	Settelment – Burgwall	Kempke 1984a Taf. 1/8 Kempke 1984c Abb. 24/13 Mülle-Wille 1991 Abb. 16/1
40	Oldenburg Kr. Ostholstein	Menkendorf	2977.27 2947.03	Settelment – Burgwall	Kempke 1984a Taf. 11/10 Kempke 1984c Abb. 26/9
41	Birka	Feldberg	327.07	Burial – (grave 559)	Brather 1996 Taf. 38/2
42	Birka	Feldberg	1268.12	Burial – (grave 33)	Brather 1996 Taf. 38/3
43	Birka	Feldberg	554.82	Burial – (grave 617)	Brather 1996 Taf. 38/4
44	Birka	Feldberg	2352.21	Burial – (grave 420)	Brather 1996 Taf. 38/5
45	Szczecin – Wzgórze Zamkowe Woj. Zachodnio – Pomorskie	Vipperow	2394.93 2458.38	Settlement – town	Cnotliwy *et al.* 1983 Ryc. 57/1
46	Szczecin – Wzgórze Zamkowe Woj. Zachodnio – Pomorskie	Vipperow	2372.32 2356.74	Settlement – town	Cnotliwy *et al.* 1983 Ryc. 48/2
47	Szczecin – Wzgórze Zamkowe Woj. Zachodnio – Pomorskie	Teterow	7788.66 7822.52	Settlement – town	Cnotliwy *et al.* 1983 Ryc. 45/1
48	Berlin – Spandau Grundstück Burgwall 12-14	Menkendorf	5469.70 5402.40	Settlement – Burgwall	Müller *et al.* 1993 Taf. 32/7 Lüdke, Schietze 2001 Taf. 280/4
49	Szczecin – Wzgórze Zamkowe Woj. Zachodnio – Pomorskie	Vipperow	1160.41 1147.28	Settlement – town	Cnotliwy *et al.* 1983 Ryc. 40/2
50	Szczecin – Wzgórze Zamkowe Woj. Zachodnio – Pomorskie	Vipperow	3666.16 3699.26	Settlement - town	Cnotliwy *et al.* 1983 Ryc. 40/12
51	Lütjenberg Kr. Calau	Prag	13581.06	Settlement – Siedlung	Warke 1973 Abb. 88/171
52	Kamień Pomorski Woj. Zachodnio – Pomorskie	Vipperow	12546.94	Settlement – Burgwall	Muzeum narodowego in Szczecin MNS A/19.609 (W/ 368/59)
53	Wolin St. 1 W. 7 Woj. Zachodnio – Pomorskie	Feldberg	5465.02	Settlement – town	Unpublished Nr 226/261/267
54	Birka	Feldberg	2395.23	Burial – (grave 456)	Brather 1996 Taf. 38/7
55	Oldenburg Kr. Ostholstein	Teterow	2494.74 2486.23	Settelment – Burgwall	Kempke 1984a Taf. 23/12 Kempke 1984c Abb. 29/11
56	Oldenburg Kr. Ostholstein	Teterow	2453.20 2431.71	Settelment – Burgwall	Kempke 1984a Taf. 25/5 Kempke 1984c Abb. 29/8
57	Birka	Feldberg	698.43	Burial	Brather 1996 Taf. 38/8
58	Mürow St. 2 Brandemburgia	Sukow	2807.27	Single find	Dulinicz 2001 Ryc. 22/32
59	Zachow Mecklenburg Region	Sukow	3394.88	Settelment – Siedlung	Dulinicz 2001 Ryc. 22/37
60	Waltersdorf St. 14 Brandenburgia	Sukow	4535.51	Settelment – Siedlung	Dulinicz 2001 Ryc. 22/33
61	Birka	Feldberg	29511.95	Burial	Brather 1996 Taf. 38/16

62	Kützerhof Kr. Demmin	Vipperow	8920.28	Settelment – Siedlung	Schoknecht 2000 Taf. 20/k
63	Schmerzke Kr. Brandenburg	Sukow	2742.70	Settelment –	Dulinicz 2001 Ryc. 22/30
64	Gielow Kr. Malchin	Sukow	13422.02 13378.99	Settlement – Siedlungsgrube	Wietrzichowski 1990 Abb. 23/10 Dulinicz 2001 Ryc. 16/5
65	Schmerzke Kr. Brandenburg	Sukow	2889.80	Settelment –	Dulinicz 2001 Ryc. 22/35
66	Berlin – Blankenburg	Sukow	3082.84	Settelment – Burgwall	Dulinicz 2001 Ryc. 22/22
67	Rathenow Kr. Havelland	Sukow	1204.68	Settelment – Burgwall	Dulinicz 2001 Ryc. 21/5
68	Kołuda	Sukow	9548.69	?	Dulinicz 2001 Ryc. 22/18
69	Jastrzębniki Woj. Zachodnio – Pomorskie	Sukow	1243.97	?	Dulinicz 2001 Ryc. 22/8
70	Berlin - Marzahn	Sukow	2646.23	Settelment – Siedlung	Dulinicz 2001 Ryc. 22/28
71	Berlin - Marzahn	Sukow	2088.30	Settelment – Siedlung	Dulinicz 2001 Ryc. 22/29
72	Kędrzyno Woj. Zachodnio – Pomorskie	Sukow	2103.54	Settlement – Burgwall	Dulinicz 2001 Ryc. 22/26
73	Görsdorf	Sukow	2628.22	Settelment – Siedlung	Dulinicz 2001 Ryc. 21/2
74	Świelubie Woj. Zachodnio – Pomorskie	Sukow	2030.82	Settelemn – town	Dulinicz 2001 Ryc. 21/1
75	Santok Woj. Lubuskie	Sukow	9773.57	Settelemn – town	Dulinicz 2001 Ryc. 18/9
76	Kiekebusch Kr. Potsdam-Mittelmark	Sukow	20693.93	Settelemnt – Siedlung	Dulinicz 2001 Ryc. 18/7
77	Lütjenberg Kr. Calau	Menkendorf	6557.25	Settlement – Siedlung	Warke 1973 Abb. 89/95
78	Lütjenberg Kr. Calau	Menkendorf	4311.01	Settlement – Siedlung	Warke 1973 Abb. 89/95
79	Lütjenberg Kr. Calau	Menkendorf	3669.48	Settlement – Siedlung	Warke 1973 Abb. 89/5
80	Lütjenberg Kr. Calau	Menkendorf	10264.00	Settlement – Siedlung	Warke 1973 Abb.90 right
81	Lütjenberg Kr. Calau	Menkendorf	2362.28	Settlement – Siedlung	Warke 1973 Abb. 90 lower left
82	Góra Woj. Wielkopolskie	Sukow	632.66	Settelment – Burgwall	Dulinicz 2001 Ryc. 15/5
83	Bruszczewo Woj. Wielkopolskie	Sukow	605.60	Settelment	Dulinicz 2001 Ryc. 15/3
84	Winna Góra Woj. Wielkopolskie	Prag	711.07	Settelemn – Siedlung	Dulinicz 2001 Ryc. 10/5
85	Presenchen Kr. Luckau	Menkendorf	671.31	Settlement – town	Henning, Heußner 1992 Abb. 4/1
86	Presenchen Kr. Luckau	Menkendorf	3598.96	Settlement – town	Henning, Heußner 1992 Abb. 4/2
87	Berlin - Spandau	Prag	1318.28	Settlement – Burgwall	Dulinicz 2001 Ryc. 10/3
88	Potsdam – Neufahrland Kr. Potsdam	Prag	628.18	Burrial	Dulinicz 2001 Ryc. 10/10
89	Berlin - Marzahn	Sukow	979.27	Settelment – Siedlung	Dulinicz 2001 Ryc. 22/24
90	Bonikowo Woj. Wielkopolskie	Sukow	809.93	Settlement	Dulinicz 2001 Ryc. 15/1
91	Berlin - Marzahn	Sukow	15945.10	Settelment – Siedlung	Dulinicz 2001 Ryc. 18/2
92	Bruszczewo Woj. Wielkopolskie	Sukow	1807.27	Settelment	Dulinicz 2001 Ryc. 15/4
93	Bruszczewo Woj. Wielkopolskie	Sukow	1214.54	Settelment	Dulinicz 2001 Ryc. 15/9
94	Biskupin Woj. Kujawsko – Pomorskie	Sukow	1602.31	Settlement – Siedlung	Dulinicz 2001 Ryc.14/1

95	Buków	Sukow	2725.55	?	Dulinicz 2001 Ryc. 14/6
96	Łobrzany (pow. Stargard Szczeciński) Woj. Zachodnio - Pomorskie	Sukow	2420.66	Settelment – Siedlung	Dulinicz 2001 Ryc. 14/5
97	Menz	Sukow	1703.51	Settelment – Besiedlung	Dulinicz 2001 Ryc. 14/4
98	Menz	Sukow	1632.97	Settelment – Besiedlung	Dulinicz 2001 Ryc. 14/7
99	Kiekebusch Kr. Potsdam-Mittelmark	Sukow	2449.42	Settelemnt – Siedlung	Dulinicz 2001 Ryc. 13/1
100	Königsborn Kr. Burg	Sukow	4733.73	?	Dulinicz 2001 Ryc. 13/10
101	Hohenseeden Kr. Jerichower Land	Sukow	1887.27	Settlement – Siedlung	Dulinicz 2001 Ryc. 13/11
102	Ujście	Sukow	2442.66	Settelemn – Siedlung	Dulinicz 2001 Ryc. 13/12
103	Klein Gladebrügge Kr. Segeberg	Prag	2199.72	Settelment – town	Dulinicz 2001 Ryc. 10/4
104	Micheln Kr Ostpirignitz - Rupin	Prag	3791.91	Settelemn – Siedlung	Dulinicz 2001 Ryc. 10/14
105	Ventschow Kr. Sternberg	Sukow	1800.1	Settelment – Siedlung	Dulinicz 2001 Ryc. 11/1
106	Kruszwica Woj. Wielkopolska	Sukow	1599.77	Settelent – Siedlung	Dulinicz 2001 Ryc. 12/7
107	Bruszczewo Woj. Wielkopolskie	Sukow	2086.97	Settelment	Dulinicz 2001 Ryc. 12/3
108	Bruszczewo Woj. Wielkopolskie	Sukow	1297.58	Settelment	Dulinicz 2001 Ryc. 12/4
109	Wildberg	Sukow	1994.23	Settelment – Burgwall	Dulinicz 2001 Ryc. 12/5
110	Mierzyn	Sukow	990.74	?	Dulinicz 2001 Ryc. 15/6
111	Nitzahn	Sukow	878.1	?	Dulinicz 2001 Ryc. 15/10
112	Rudki	Sukow	24828.75	?	Dulinicz 2001 Ryc. 17/1
113	Buków	Sukow	22846.57	?	Dulinicz 2001 Ryc. 17/2
114	Menzlin Kr. Anklam	Sukow	11339.20	Settelment – Burgwall	Dulinicz 2001 Ryc. 19/7
115	Obrzycko	Sukow	21029.95	?	Dulinicz 2001 Ryc. 19/2
116	Szczecin – Wzgórze Zamkowe Woj. Zachodnio – Pomorskie	Vipperow	12159.88 12001.37	Settlement – town	Cnotliwy *et al.* 1983 Ryc. 123/5 Lüdke, Schietze 2001 Taf. 295/5
117	Szczecin – Wzgórze Zamkowe Woj. Zachodnio – Pomorskie	Feldberg	1779.71 1750.58	Settlement – town	Cnotliwy *et al.* 1983 Ryc. 94/6
118	Mühlengeez Kr. Güstrow	Prag	1005.05	?	Dulinicz 2001 Ryc. 10/1
119	Bosau – Bischofswerder	Sukow	11032.81	Settelment – Siedlung	Dulinicz 2001 Ryc. 19/8
120	Oldenburg Kr. Ostholstein	Sukow	13133.01 13215.32	Settelment – Burgwall	Kempke 1984a taf 2/8
121	Kützerhof Kr. Demmin	Vipperow	7115.31	Settelment – Siedlung	Schoknecht 2000 Taf. 21/g
122	Friedberg Kr. Neubrandenburg	Sukow	7787.04 7693.92	?	Faust *et al.* 1979 Taf. 50/47/1 Dulinicz 2001 Ryc. 17/7
123	Schmerzke Kr. Brandenburg	Sukow	17353.50	Settelment –	Dulinicz 2001 Ryc. 17/5
124	Thelkow Kr. Rostock	Bobzin	5942.89	Burrial – cremation	Schuldt 1956 Abb. 46/a
125	Rügen Kr. Rügen	Bobzin	1912.31	Settelment – Burgwall	Schuldt 1956 Abb. 46/b
126	Quilitz Kr. Wolgast	Bobzin	4829.96	Hoard	Schuldt 1956 Abb. 46/d
127	Putbus Kr. Rügen	Bobzin	4166.01	Settelment – Burg	Schuldt 1956 Abb. 45/a

128	Teterow Kr. Teterow	Bobzin	6551.97	Settlement – Siedlung	Schuldt 1956 Abb. 45/b
129	Bergen Kr. Rügen	Bobzin	2369.65	Settlement – Burg	Schuldt 1956 Abb. 45/d
130	Wolgast Kr. Wolgast	Bobzin	1299.66	Burrial cremation	Schuldt 1956 Abb. 45/e
131	Bobzin Kr. Lübz	Feldberg	3721.08	Settelment – Burgwall	Schuldt 1956 Abb. 23/a
132	Neubrandenbug (Fischerinsel) Kr. Neubrandenburg	Feldberg	885.74	Settelment – Burgwall	Schuldt 1956 Abb. 23/b
133	Dahmen Kr. Teterow	Feldberg	26447.98	Settelment – Siedlung	Schuldt 1956 Abb. 23/c
134	Anklam Kr. Anklam	Feldberg	11339.52	Settelment – Siedlung	Schuldt 1956 Abb. 16/a
135	Teterow XLIX.601 Kr. Teterow	Teterow	7235.45	Settelment – Burgwall	Schuldt 1956 Abb. 61/a
136	Teterow XLIX.650 Kr. Teterow	Teterow	2321.76	Settelment – Burgwall	Schuldt 1956 Abb. 61/b
137	Waren Kr. Waren	Teterow	2914.43	Settelment – Burgwall	Schuldt 1956 Abb. 58/a
138	Teterow XXXIVd.134 Kr. Teterow	Teterow	4726.68	Settelment – Burgwall	Schuldt 1956 Abb. 57/a
139	Lancken Kr. Parchim	Teterow	4722.03	Settelment – Siedlng	Schuldt 1956 Abb. 56/e
140	Damm Kr. Rostock	Teterow	4923.94	Settelment – Siedlung	Schuldt 1956 Abb. 55/a
141	Wustrow Kr. Waren	Menkendorf	2968.91	Settelment – Siedlung	Schuldt 1956 Abb. 9/a
142	Schönlage Kr. Sternberg	Menkendorf	1742.16	Settlemen – Siedlung	Schuldt 1956 Abb. 9/b
143	Klein Plasten Kr. Waren	Menkendorf	1814.75	Single find - Einzelfu	Schuldt 1956 Abb. 9/c
144	Schwaan Kr. Bützow	Menkendorf	2974.00	Settelment – Siedlung	Schuldt 1956 Abb. 9/d
145	Groß Zastrow Kr. Demmin	Menkendorf	2953.97	Settelment – Siedlung	Schuldt 1956 Abb. 9/e
146	Warin Kr. Wismar	Menkendorf	1860.60	?	Schuldt 1956 Abb. 3/a
147	Feldberg Kr. Neustrelitz	Menkendorf	645.57	Settelment – Burgwall	Schuldt 1956 Abb. 3/b
148	Sülze Kr. Rostock	Menkendorf	2485.88	Settelment – Siedlung	Schuldt 1956 Abb. 2/a
149	Gaarz Kr. Lübz	Menkendorf	2488.27	Settelment – Burgwall	Schuldt 1956 Abb. 2/d
150	Dummerstorf Kr. Rostock	Vipperow	4174.23	Settelment – Siedlung	Schuldt 1956 Abb. 76/a
151	Teterow XVI.2 Kr. Teterow	Vipperow	4136.60	Settelment – Burgwall	Schuldt 1956 Abb. 77/a
152	Teterow XLIV.1084 Kr. Teterow	Vipperow	2436.12	Settelment – Burgwall	Schuldt 1956 Abb. 77/b
153	Finkenwerder Kr. Lübz	Vipperow	7863.14	Settelment – Siedlung	Schuldt 1956 Abb. 78/a
154	Neuhaus Kr. Strasburg	Vipperow	8416.23	Settlement – Siedlung	Schuldt 1956 Abb. 78/b
155	Waren Kr. Waren	Vipperow	13889.70	Settelment – Burgwall	Schuldt 1956 Abb. 80/a
156	Waren Kr. Waren	Vipperow	15580.05	Settelment – Burgwall	Schuldt 1956 Abb. 80/b
157	Ramin Kr. Pasewalk	Vipperow	11378.61	Settelment – Siedlng	Schuldt 1956 Abb. 81/a
158	Waren Kr. Waren	Vipperow	7140.01	Settelment – Burgwall	Schuldt 1956 Abb. 82/a
159	Teterow XVI.2 Kr. Teterow	Vipperow	4199.47	Settelment – Burgwall	Schuldt 1956 Abb. 83/a
160	Teterow XVI.3 Kr. Teterow	Vipperow	4160.08	Settelment – Burgwall	Schuldt 1956 Abb. 84/a

161	Vipperow Kr. Röbel	Vipperow	7124.34	Settelment – Burgwall	Schuldt 1956 Abb. 85/a
162	Damm Kr. Rostock	Vipperow	931.75	Settelment – Siedlung	Schuldt 1956 Abb. 87/a
163	Dinnies Kr. Lübz	Vipperow	1230.77	?	Schuldt 1956 Abb. 87/b
164	Waren Kr. Waren	Woldegk	4020.54	Settelment – Burgwall	Schuldt 1956 Abb. 31/a
165	Presenchen Kr. Luckau	Menkendorf	3064.42	Settlement – Burg	Henning, Heußner 1992 Abb. 4/4
166	Mecklenburg	Sukow	2296.51	Settlement – Burgwall	Donat 1982 Abb. 5/6
167	Mecklenburg	Sukow	1728.37	Settlement – Burgwall	Donat 1982 Abb. 5/7
168	Mecklenburg	Sukow	2744.85	Settlement – Burgwall	Donat 1982 Abb. 6/3
169	Blankensee Kr. Neutsrelitz	Weisdin	29061.18	Settelment – Siedlung	Schuldt 1956 Abb. 68/c
170	Dargnen Kr. Wolgast	Weisdin	16255.96	Settelment – Siedlung	Schuldt 1956 Abb. 73/a
171	Schmerzke Kr. Brandenburg	Sukow	2384.16	Settlemen – Besiedlung	Donat 2001 Abb.1/3
172	Sulmierzyce	Sukow	2172.65	?	Dulinicz 2001 Ryc. 15/2
173	Schmerzke Kr. Brandenburg	Sukow	1854.74	Settelment – hillford standpost	Dulinicz 2001 Ryc. 22/36
174	Stare Drawsko	Sukow	7197.17	?	Dulinicz 2001 Ryc. 18/8
175	Szczecin – Wzgórze Zamkowe Woj. Zachodnio – Pomorskie	Vipperow	6516.38 6597.45	Settlement – town	Cnotliwy *et al.* 1983 Ryc. 94/7
176	Szczecin – Wzgórze Zamkowe Woj. Zachodnio – Pomorskie	Teterow	5312.81 5385.94	Settlement – town	Cnotliwy *et al.* 1983 Ryc. 118/15 Lüdke, Schietze 2001 Taf. 295/7
177	Schmerzke Kr. Brandenburg	Sukow	4044.93	Settelment – hillford standpost	Dulinicz 2001 Ryc. 22/31
178	Dziedzice	Sukow	7340.80	Settelment	Dulinicz 2001 Ryc. 11/2
179	Biskupin Woj. Kujawsko – Pomorskie	Sukow	4119.09	Settlement – Siedlung	Dulinicz 2001 Ryc. 20/1
180	Dziedzice	Sukow	9123.17	Settelment	Dulinicz 2001 Ryc. 22/21
181	Połupin Woj. Lubuskie	Sukow	5657.43	Settelment – Burgwall	Dulinicz 2001 Ryc. 22/15
182	Kruszwica Woj. Wielkopolska	Sukow	7412.64	Settelent – Siedlung	Dulinicz 2001 Ryc. 22/20
183	Kołuda	Sukow	9393.70	?	Dulinicz 2001 Ryc. 22/18
184	Kruszwica Woj. Wielkopolska	Sukow	8789.17	Settelent – Siedlung	Dulinicz 2001 Ryc. 22/19
185	Nowiny	Sukow	4511.56	Settelemn – Siedlung	Dulinicz 2001 Ryc. 22/9
186	Buków	Sukow	5954.54	?	Dulinicz 2001 Ryc. 22/13
187	Nowiny	Sukow	7651.03	Settelemn – Siedlung	Dulinicz 2001 Ryc. 22/14
188	Dziedzice	Prag	4803.73	Settelment	Dulinicz 2001 Ryc. 10/15
189	Bruszczewo Woj. Wielkopolskie	Sukow	7005.36	Settelment	Dulinicz 2001 Ryc. 12/6
190	Ventschow Kr. Sternberg	Sukow	14053.91	Settelment – Siedlung	Dulinicz 2001 Ryc. 11/1
191	Alt Lübeck	Sukow	9077.39	Settelment – Burgwall	Dulinicz 2001 Ryc. 18/4
192	Szczecin – Wzgórze Zamkowe Woj. Zachodnio – Pomorskie	Teterow	18604.63 18597.27	Settlement – town	Cnotliwy *et al.* 1983 Ryc.94/2
193	Wattmanshagen Fpl. 10 Kr. Hagenow	Sukow	8726.60	?	Wietrzichowski 1990 Abb. 9/7 Dulinicz 2001 Ryc. 13/6

194	Bad Sülze Kr. Ribnitz-Damgarten	Sukow	1751.03	Settelment – Siedlung	Faust *et al.* 1979 Taf. 38/3/1 Dulinicz 2001 Ryc. 13/5
195	Schmerzke Kr. Brandenburg	Sukow	2314.31	Settlemen – Besiedlung	Donat 2001 Abb.1/4
196	Wolin St. 1 W6 Woj. Zachodnio – Pomorskie	Menkendorf	2375.09	Settlement – town	Cnotliwy *et al.* 1986 Ryc 18/4
197	Parum Kr. Hagenow	Sukow	7871.00	Settelment – Burgwall	Wietrzichowski 1990 Abb. 8/10 Dulinicz 2001 Ryc. 13/9
198	Schartau	Sukow	1040.35	Settelment - Burg	Bastian *et al.* 1973 Taf. 36/42/1 Dulinicz 2001 Ryc. 13/8
199	Brelin – Marzahn	Sukow	6419.49	Settelment – Siedlung	Dulinicz 2001 Ryc. 16/4
200	Kruszwica Woj. Wielkopolska	Sukow	8680.30	Settelent – Siedlung	Dulinicz 2001 Ryc. 16/2
201	Szczecin – Wzgórze Zamkowe Woj. Zachodnio – Pomorskie	Feldberg	2498.97 2507.99	Settlement – town	Cnotliwy *et al.* 1983 Ryc. 13/1 Lüdke, Schietze 2001 Taf. 293/12
202	Behren-Lübchin Kr. Güstrow	Teterow	2957.26	Settlement – Burg	Schuldt 1965 Taf. 5/III/128
203	Behren-Lübchin Kr. Güstrow	Teterow	2956.70	Settlement – Burg	Schuldt 1965 Taf. 5/III/13g
204	Behren-Lübchin Kr. Güstrow	Teterow	4174.41	Settlement – Burg	Schuldt 1965 Taf. 5/III/74
205	Behren-Lübchin Kr. Güstrow	Teterow	4142.82	Settlement – Burg	Schuldt 1965 Taf. 5/XII/1170
206	Behren-Lübchin Kr. Güstrow	Vipperow	5319.06	Settlement – Burg	Schuldt 1965 Taf. 7/III/86
207	Behren-Lübchin Kr. Güstrow	Vipperow	7153.92	Settlement – Burg	Schuldt 1965 Taf. 7/III/148
208	Behren-Lübchin Kr. Güstrow	Vipperow	2424.37	Settlement – Burg	Schuldt 1965 Taf. 7/III/35
209	Behren-Lübchin Kr. Güstrow	Vipperow	2499.03	Settlement – Burg	Schuldt 1965 Taf. 7/III/204
210	Behren-Lübchin Kr. Güstrow	Vipperow	4912.36	Settlement – Burg	Schuldt 1965 Taf. 8/III/120
211	Behren-Lübchin Kr. Güstrow	Vipperow	2391.59	Settlement – Burg	Schuldt 1965 Taf. 8/III/13/i
212	Behren-Lübchin Kr. Güstrow	Vipperow	2452.52	Settlement – Burg	Schuldt 1965 Taf. 8/III/49
213	Behren-Lübchin Kr. Güstrow	Vipperow	4499.45	Settlement – Burg	Schuldt 1965 Taf. 8/XV/1
214	Behren-Lübchin Kr. Güstrow	Vipperow	2332.23	Settlement – Burg	Schuldt 1965 Taf. 8/XV/16
215	Behren-Lübchin Kr. Güstrow	Bobzin wooden copy	725.20	Settlement – Burg	Schuldt 1965 Taf. 31/III/214
216	Behren-Lübchin Kr. Güstrow	Bobzin wooden copy	734.36	Settlement – Burg	Schuldt 1965 Taf. 31/III/82
217	Sanzkow Kr Demmin	Vipperow	2499.47	Settelment – Siedlung	Lüth, Schoknecht 2000 Ryc. 144
218	Belling Kr. Uecker – Randow	Sukow	2533.91	?	Lüth, Schoknecht 2000 Ryc. 124/4
219	Pasewalk	Vipperow	6527.49	Burial – (grave 13)	Schoknecht 1998 Taf. 26/f
220	Pasewalk	Teterow	8986.66	Burial – (grave B)	Schoknecht 1998 Taf. 42
221	Viervitz Kr. Rügen	Fresendorf	5616.73	Keisgrube	Lüth, Schoknecht 1998 Abb. 155
222	Wendelstorf Kr. Bad Doberan	Teterow	1727.26	Settlement – Siedlung	Lampe 1975 Abb. 6/f
223	Wendelstorf Kr. Bad Doberan	Vipperow	1338.13	Settlement – Siedlung	Lampe 1975 Abb. 6/i
224	Rützenfelde Lkr. Demmin	Fresendorf	4157.07	Grube	Lüth, Schoknecht 1996 Abb. 131/f
225	Goldenbow Kr. Ludwigslust	Menkendorf	8518.04	Settelment – Siedlug	Lüth, Schoknecht 1995 Abb. 153
226	Natzevitz Kr. Rügen	Teterow	6167.99	Settelment – Siedlungsgruben	Lampe 1983 Abb. 2/a

227	Natzevitz Kr. Rügen	Teterow	13198.97	Settelment – Siedlungsgruben	Lampe 1983 Abb. 2/b
228	Natzevitz Kr. Rügen	Teterow	3595.83	Settelment – Siedlungsgruben	Lampe 1983 Abb. 3/d
229	Natzevitz Kr. Rügen	Teterow	671.88	Settelment – Siedlungsgruben	Lampe 1983 Abb. 3/e
230	Natzevitz Kr. Rügen	Vipperow	1755.48	Settelment – Siedlungsgruben	Lampe 1983 Abb. 3/b
231	Natzevitz Kr. Rügen	Teterow	2974.96	Settelment – Siedlungsgruben	Lampe 1983 Abb. 4/a
232	Natzevitz Kr. Rügen	Teterow	1921.57	Settelment – Siedlungsgruben	Lampe 1983 Abb. 4/d
233	Löcknitz Kr. Pasewalk	Menkendorf	7245.93	Burrial mount nr. 2	Gralow 1982 Abb. 6/a
234	Löcknitz Kr. Pasewalk	Vipperow	6115.40	Burrial mount nr. 2	Gralow 1982 Abb. 6/e
235	Löcknitz Kr. Pasewalk	Teterow	3543.30	Burrial mount nr. 2	Gralow 1982 Abb. 6/b
236	Löcknitz Kr. Pasewalk	Menkendorf	8911.25	Burrial mount nr. 2	Gralow 1982 Abb. 6/d
237	Wetzenow Kr. Pasewalk	Sukow	10230.66	Settelment – Siedlung	Schleicher, Schoknecht 1982 Abb. 4/d
238	Wetzenow Kr. Pasewalk	Feldberg	14372.17	Settelment – Siedlung	Schleicher, Schoknecht 1982 Abb. 10/h
239	Malchin	Feldberg	13750.62	Settelment – Burgwall	Schoknecht 1982 Abb.12/f
240	Neukalen Kr. Malchin	Teterow	6142.40	Settlement – Burgwall	Schoknecht 1981 Abb. 35/e
241	Salzow Kr. Pasewalk	Teterow	11472.85	?	Schoknecht 1990 Abb. 12/a
242	Krien Kr. Anklam	Teterow	653.28	Settlement – Siedlung	Schoknecht 1990 Abb. 20/e
243	Malkwitz Kr. Waren	Teterow	1879.74	Settlement – Siedlung	Schoknecht 1988 Abb. 3/a
244	Malkwitz Kr. Waren	Teterow	673.81	Settlement – Siedlung	Schoknecht 1988 Abb. 3/b
245	Malkwitz Kr. Waren	Woldegk	625.44	Settlement – Siedlung	Schoknecht 1988 Abb. 3/e
246	Laschendorf Kr. Waren	Vipperow	4196.03	Settelment – Burgwall	Schoknecht 1988 Abb. 3/i
247	Cammin Kr. Rostock	Vipperow	3512.51	Settelment – Siedlung	Lampe, Stange 1988 Abb. 1/x
248	Rostock Stadtkern	Teterow	5919.58	Settelment – Burgwall	Schäfer, Lange 1988 Abb. 4/a
249	Rostock Stadtkern	Fresendorf	3045.52	Settelment – Burgwall	Schäfer, Lange 1988 Abb. 5/a
250	Kützerhof Kr. Malchin	Vipperow	9026.47	Settelment – Siedlng	Schoknecht 1986 Abb. 7/k
251	Kützerhof Kr. Malchin	Vipperow	7917.47	Settelment – Siedlng	Schoknecht 1986 Abb. 8/g
252	Minzow Kr. Röbel	Menkendorf	1907.17	Settelment – Siedlung	Schoknecht 1986 Abb.11/l
253	Strasburg Kr. Strasburg	Vipperow	1904.08	Settlement – Siedlung	Lüth, Schoknecht 1993 Abb. 30/d
254	Teterow Kr. Teterow	Teterow	1931.80	Settelment – Burgwall	Lüth, Schoknecht 1993 Abb. 38/a
255	Dümmer Kr. Schwerin	Menkendorf	2354.28	Setellment – Inselsiedlung	Wietrzichowski 1991 Abb. 9/a
256	Dümmer Kr. Schwerin	Menkendorf	1751.13	Setellment – Inselsiedlung	Wietrzichowski 1991 Abb. 9/b
257	Battin Kr. Pasewalk	Vipperow	5930.90	?	Schoknecht 1991 Abb. 2/a
258	Pasewalk Kr. Neubrandenburg	Sukow	14748.28	?	Schoknecht 1991 Abb. 15/c
259	Cammin Kr. Neubrandenburg	Fresendorf	3208.86	Burial – (grave 2)	Schmidt 1981 Abb. 3/d

260	Cammin. Kr. Neubrandenburg	Vipperow	1813.08	Burial – (grave 3)	Schmidt 1981 Abb. 4/a
261	Cammin Kr. Neubrandenburg	Teterow	1149.61	Burial – (grave 3)	Schmidt 1981 Abb. 4/b
262	Mutzschen Kr. Grimma	Sukow	1037.57	Settelment – Siedlung	Baumann 1961 Abb. 1/1
263	Cammin Kr. Neubrandenburg	Vipperow	3532.65	Burial – (grave 3)	Schmidt 1981 Abb. 4/d
264	Cammin Kr. Neubrandenburg	Vipperow	5488.85	Burial – (grave 3)	Schmidt 1981 Abb. 4/e
265	Neuenkirchen Kr. Neubrandenburg	Menkendorf	2541.48	Burial – (grave 4b)	Schmidt 1981 Abb. 7/b
266	Neuenkirchen Kr. Neubrandenburg	Menkendorf	1775.92	Settelment – Siedlungsgrube	Schmidt 1981 Abb. 7/c
267	Schwanbeck Kr. Neubrandenburg	Bobzin	1154.73	Burial – (grave 1)	Schmidt 1981 Abb. 9/a
268	Schwanbeck Kr. Neubrandenburg	Vipperow	1279.06	Settelment – Siedlung	Schmidt 1981 Abb. 9/e
269	Schwennenz Kr. Pasewalk	Menkendorf	556.73	Settelment – Burgwall	Schmidt 1981 Abb. 9/g
270	Schmerzke Kr. Brandenburg	Sukow	1688.47	Settlemen – Besiedlung	Donat 2001 Abb.1/5
271	Kassebohm Hansestadt Rostock	Menkendorf	1306.13	Settelment – Siedlug	Lüth, Schoknecht 2000 Abb. 163/1
272	Kassebohm Hansestadt Rostock	Teterow	2335.92	Settelment – Siedlug	Lüth, Schoknecht 2000 Abb. 163/2
273	Kassebohm Hansestadt Rostock	Teterow	2956.81	Settelment – Siedlug	Lüth, Schoknecht 2000 Abb. 163/3
274	Lindow Kr. Mecklenburg-Strelitz	Vipperow	6639.92	Fortyfication – standpost - Kastenbrunnen	Lüth, Schoknecht 2000 Abb. 168/1
275	Lindow Kr. Mecklenburg-Strelitz	Vipperow	6579.08	Fortyfication – standpost - Kastenbrunnen	Lüth, Schoknecht 2000 Abb. 168/2
276	Janow Kr. Anklam	Feldberg	5513.51	Settelment - Siedlungsgruben	Schoknecht 1984 Abb. 11/d
277	Rattey Kr. Neubrandenburg	Feldberg	6714.88	Settelment – Siedlung	Schoknecht 1984 Abb. 11/a
278	Schwanbeck Kr. Neubrandenburg	Vipperow	5938.26	Settelment – Siedlung	Schoknecht 1984 Abb. 11/d
279	Schwanbeck Kr. Neubrandenburg	Vipperow	4699.99	Settelment – Siedlung	Schoknecht 1984 Abb. 11/e
280	Demmin Kr. Neubrandenburg	Teterow	5993.18	Settelment – Burgwall	Schoknecht 1985 Abb. 13
281	Alt Käbelich Kr. Strasburg	Menkendorf	2417.10	Buriall – Grab nr. 7	Schmidt 1985 Abb. 4/j
282	Rossow Kr.Pasewalk	Vipperow	9669.14	Settelment – Siedlung	Schoknecht 1980 Abb. 40/e
283	Marlow Kr. Ribnitz	Menkendorf	2980.15	Settlement – Burg an Wiek	Hollnagel 1974 Abb.3/e
284	Gellin Kr. Pasewalk	Menkendorf	2372.09	Settelment – Siedlung	Schoknecht 1980 Abb. 13/a
285	Gellin Kr. Pasewalk	Teterow	2521.83	Settelment – Siedlung	Schoknecht 1980 Abb. 14/a
286	Gellin Kr. Pasewalk	Teterow	3621.97	Settelment – Siedlung	Schoknecht 1980 Abb. 14/b
287	Gellin Kr. Pasewalk	Menkendorf	2984.29	Settelment – Siedlung	Schoknecht 1980 Abb. 14/c
288	Sternberger Kr. Sternberg	Sukow	7374.49	Settelment – Burgwall	Schuldt 1983 Abb. 22/b
289	Groß Raden Kr. Sternberg	Menkendorf	11338.96	Settlement – Siedlung	Schuldt 1981 Taf. 1/a (XXXIX/54)
290	Groß Raden Kr. Sternberg	Menkendorf	28189.56	Settlement – Siedlung	Schuldt 1981 Taf. 1/b (XXXIX/1450)
291	Groß Raden Kr. Sternberg	Menkendorf	13126.51	Settlement – Siedlung	Schuldt 1981 Taf. 2/a (XXXIX/1447)
292	Groß Raden	Menkendorf	12568.66	Settlement –	Schuldt 1981 Taf. 2/b (XXXIX/415)

	Kr. Sternberg			Siedlung	
293	Groß Raden Kr. Sternberg	Menkendorf	16828.32	Settlement – Siedlung	Schuldt 1981 Taf. 3/b (XXXIX/1448)
294	Groß Raden Kr. Sternberg	Menkendorf	11530.53	Settlement – Siedlung	Schuldt 1981 Taf. 4/a (II/1)
295	Groß Raden Kr. Sternberg	Menkendorf	19312.94	Settlement – Siedlung	Schuldt 1981 Taf. 4/b (IV/745)
296	Groß Raden Kr. Sternberg	Menkendorf	11435.85	Settlement – Siedlung	Schuldt 1981 Taf. 5/a (IV/848)
297	Groß Raden Kr. Sternberg	Menkendorf	22167.55	Settlement – Siedlung	Schuldt 1981 Taf. 5/b (XV/15)
298	Groß Raden Kr. Sternberg	Menkendorf	11429.93	Settlement – Siedlung	Schuldt 1981 Taf. 6/a (XXVIII/12)
299	Groß Raden Kr. Sternberg	Menkendorf	8987.94	Settlement – Siedlung	Schuldt 1981 Taf. 6/b (VIII/4081)
300	Groß Raden Kr. Sternberg	Menkendorf	7772.99	Settlement – Siedlung	Schuldt 1981 Taf. 7/b (XXXIX/1434)
301	Groß Raden Kr. Sternberg	Menkendorf	20426.48	Settlement – Siedlung	Schuldt 1981 Taf. 8/a (XXXIX/41)
302	Groß Raden Kr. Sternberg	Menkendorf	22800.45	Settlement – Siedlung	Schuldt 1981 Taf. 8/b (XXXIX/1433)
303	Groß Raden Kr. Sternberg	Menkendorf	14518.72	Settlement – Siedlung	Schuldt 1981 Taf. 10/a (XXXIX/1422)
304	Groß Raden Kr. Sternberg	Menkendorf	27555.97	Settlement – Siedlung	Schuldt 1981 Taf. 10/b (XXXIX/1460)
305	Groß Raden Kr. Sternberg	Menkendorf	10175.19	Settlement – Siedlung	Schuldt 1981 Taf. 11/a (XII/92)
306	Groß Raden Kr. Sternberg	Menkendorf	20323.61	Settlement – Siedlung	Schuldt 1981 Taf. 11/b (VIII/10800)
307	Groß Raden Kr. Sternberg	Menkendorf	12064.58	Settlement – Siedlung	Schuldt 1981 Taf. 12/a (VIII/6637)
308	Groß Raden Kr. Sternberg	Menkendorf	17342.74	Settlement – Siedlung	Schuldt 1981 Taf. 12/b (VIII/6659)
309	Groß Raden Kr. Sternberg	Menkendorf	20466.87	Settlement – Siedlung	Schuldt 1981 Taf. 13/b (XXXIX/1459)
310	Groß Raden Kr. Sternberg	Menkendorf	7830.33	Settlement – Siedlung	Schuldt 1981 Taf. 15/a (VIII/187)
311	Groß Raden Kr. Sternberg	Menkendorf	2963.62	Settlement – Siedlung	Schuldt 1981 Taf. 15/b (XII/13)
312	Groß Raden Kr. Sternberg	Menkendorf	1776.55	Settlement – Siedlung	Schuldt 1981 Taf. 15/c (XXXI/13)
313	Groß Raden Kr. Sternberg	Menkendorf	1310.32	Settlement – Siedlung	Schuldt 1981 Taf. 15/d (XXII/49)
314	Groß Raden Kr. Sternberg	Menkendorf	3100.74	Settlement – Siedlung	Schuldt 1981 Taf. 15/e (VIII/1962)
315	Groß Raden Kr. Sternberg	Menkendorf	4161.32	Settlement – Siedlung	Schuldt 1981 Taf. 15/f (VIII/2103)
316	Wolin – Port St.1 wykop 8	Fresendorf	4603.87 2911.91	Settlement – town	Stanisławski 1998 Ryc. 4.6/e
317	Wolin – Port St.1 wykop 8 Woj. Zachodnio – Pomorskie	Fresendorf	3222.22 2897.14	Settlement – town	Stanisławski 1998 Ryc. 4.6/a
318	Berlin – Spandau Grundstück Burgwall 12-14	Menkendorf	9071.30	Settelment – Burgwall	Müller *et al.* 1993 Taf. 1/8
319	Berlin – Spandau Grundstück Burgwall 12-14	Menkendorf	10152.74	Settelment – Burgwall	Müller *et al.* 1993 Taf. 1/9
320	Berlin - Spandau	Menkendorf	791.17	Settlement – Burgwall	Lüdke, Schietze 2001 Taf. 278/1
321	Berlin - Spandau	Menkendorf	1176.83	Settlement – Burgwall	Lüdke, Schietze 2001 Taf. 278/7
322	Berlin – Spandau Grundstück Burgwall 12-14	Menkendorf	4777.28	Settlement – Burgwall	Müller *et al.* 1993 Taf. 5/14
323	Berlin – Spandau Grundstück Burgwall 12-14	Menkendorf	8834.92	Settlement – Burgwall	Müller *et al.* 1993 Taf. 5/15
324	Berlin – Spandau Grundstück Burgwall 20	Menkendorf	5446.24	Settlement – Burgwall	Müller *et al.* 1993 Taf. 9/9

325	Berlin – Spandau Grundstück Burgwall 20	Menkendorf	8957.16	Settlement – Burgwall	Müller *et al.* 1993 Taf. 9/11
326	Berlin – Spandau Grundstück Burgwall 20	Menkendorf	1107.72	Settlement – Burgwall	Müller *et al.* 1993 Taf. 8/6
327	Berlin – Spandau Grundstück Burgwall 20	Menkendorf	4255.44	Settlement – Burgwall	Müller *et al.* 1993 Taf. 8/10
328	Berlin – Spandau Grundstück Burgwall 17	Menkendorf	1782.11	Settlement – Burgwall	Müller *et al.* 1993 Taf. 61/11
329	Berlin – Spandau Grundstück Burgwall 12-14	Menkendorf	8319.42	Settlement – Burgwall	Müller *et al.* 1993 Taf. 14/11
330	Berlin – Spandau Grundstück Burgwall 12-14	Menkendorf	840.04	Settlement – Burgwall	Müller *et al.* 1993 Taf. 15/1
331	Berlin – Spandau Grundstück Burgwall 12-14	Menkendorf	2976.25	Settlement – Burgwall	Müller *et al.* 1993 Taf. 15/10
332	Berlin – Spandau Grundstück Burgwall 12-14	Menkendorf	2381.81	Settlement – Burgwall	Müller *et al.* 1993 Taf. 15/11
333	Berlin – Spandau Grundstück Burgwall 12-14	Menkendorf	5975.36	Settlement – Burgwall	Müller *et al.* 1993 Taf. 15/12
334	Berlin – Spandau Grundstück Burgwall 20	Menkendorf	3617.78	Settlement – Burgwall	Müller *et al.* 1993 Taf. 21/13
335	Berlin – Spandau Grundstück Burgwall 20	Menkendorf	1761.01	Settlement – Burgwall	Müller *et al.* 1993 Taf. 22/7
336	Berlin – Spandau Grundstück Burgwall 20	Menkendorf	1279.38	Settlement – Burgwall	Müller *et al.* 1993 Taf. 22/10
337	Berlin – Spandau Grundstück Burgwall 12-14	Menkendorf	4803.51	Settlement – Burgwall	Müller *et al.* 1993 Taf. 31/4
338	Berlin – Spandau Grundstück Burgwall 12-14	Menkendorf	4822.28	Settlement – Burgwall	Müller *et al.* 1993 Taf. 31/5
339	Berlin – Spandau Grundstück Burgwall 12-14	Menkendorf	19175.87	Settlement – Burgwall	Müller *et al.* 1993 Taf. 31/6
340	Berlin – Spandau Grundstück Burgwall 12-14	Menkendorf	9636.50	Settlement – Burgwall	Müller *et al.* 1993 Taf. 30/5
341	Berlin – Spandau Grundstück Burgwall 12-14	Menkendorf	2453.58	Settlement – Burgwall	Müller *et al.* 1993 Taf. 30/7
342	Berlin – Spandau	Menkendorf	6537.46	Settlement – Burgwall	Lüdke, Schietze 2001 Taf. 278/3
343	Berlin – Spandau Grundstück Burgwall 12-14	Menkendorf	1224.47	Settlement – Burgwall	Müller *et al.* 1993 Taf. 45/6
344	Berlin – Spandau Grundstück Burgwall 12-14	Menkendorf	1786.61	Settlement – Burgwall	Müller *et al.* 1993 Taf. 45/9
345	Berlin – Spandau Grundstück Burgwall 17	Menkendorf	3563.32	Settlement – Burgwall	Müller *et al.* 1993 Taf. 44/10
346	Berlin – Spandau Grundstück Burgwall 12-14	Vipperow	582.39	Settlement – Burgwall	Müller *et al.* 1993 Taf. 47/3
347	Berlin – Spandau Grundstück Burgwall 12-14	Vipperow	4716.81	Settlement – Burgwall	Müller *et al.* 1993 Taf. 47/12
348	Berlin – Spandau Grundstück Burgwall 17	Menkendorf	3065.02	Settlement – Burgwall	Müller *et al.* 1993 Taf. 48/12
349	Berlin – Spandau Grundstück Burgwall 20	Menkendorf	1903.85	Settlement – Burgwall	Müller *et al.* 1993 Taf. 51/15
350	Berlin – Spandau Grundstück Burgwall 17	Vipperow	2990.94	Settlement – Burgwall	Müller *et al.* 1993 Taf. 53/9
351	Berlin – Spandau Grundstück Burgwall 17	Vipperow	3695.82	Settlement – Burgwall	Müller *et al.* 1993 Taf. 53/10
352	Berlin – Spandau Grundstück Burgwall 17	Vipperow	4715.91	Settlement – Burgwall	Müller *et al.* 1993 Taf. 53/12
353	Berlin – Spandau Grundstück Burgwall 17	Vipperow	5970.77	Settlement – Burgwall	Müller *et al.* 1993 Taf. 54/14
354	Berlin – Spandau Grundstück Burgwall 15	Vipperow	1249.43	Settlement – Burgwall	Müller *et al.* 1993 Taf. 58/4
355	Berlin – Spandau Grundstück Burgwall 15	Teterow	2927.79	Settlement – Burgwall	Müller *et al.* 1993 Taf. 58/8
356	Berlin – Spandau Grundstück Burgwall 15	Weisdin	13839.24	Settlement – Burgwall	Müller *et al.* 1993 Taf. 58/9
357	Berlin – Spandau Grundstück Burgwall 17	Vipperow	2501.61	Settlement – Burgwall	Müller *et al.* 1993 Taf. 61/10

358	Berlin – Spandau Grundstück Burgwall 17	Vipperow	6728.53	Settlement – Burgwall	Müller *et al.* 1993 Taf. 61/12
359	Berlin - Spandau	Menkendorf	5347.77	Settlement – Burgwall	Lüdke, Schietze 2001 Taf. 279/5
360	Berlin – Spandau Grundstück Burgwall 20	Vipperow	4108.19	Settlement – Burgwall	Müller *et al.* 1993 Taf. 64/13
361	Berlin – Spandau Grundstück Burgwall 23	Vipperow	586.13	Settlement – Burgwall	Müller *et al.* 1993 Taf. 70/1
362	Berlin – Spandau Grundstück Burgwall 23	Teterow	1789.39	Settlement – Burgwall	Müller *et al.* 1993 Taf. 70/6
363	Berlin – Spandau Grundstück Burgwall 23	Bobzin	2485.98	Settlement – Burgwall	Müller *et al.* 1993 Taf. 73/13
364	Berlin - Spandau	Menkendorf	1893.03	Settlement – Burgwall	Lüdke, Schietze 2001 Taf. 80/5
365	Berlin – Spandau Grundstück Burgwall 17	Vipperow	2401.52	Settlement – Burgwall	Müller *et al.* 1993 Taf. 77/12
366	Berlin – Spandau Grundstück Burgwall 17	Vipperow	2998.74	Settlement – Burgwall	Müller *et al.* 1993 Taf. 76/6
367	Berlin – Spandau Grundstück Burgwall 17	Vipperow	6530.10	Settlement – Burgwall	Müller *et al.* 1993 Taf. 79/14
368	Berlin – Spandau Grundstück Burgwall 17	Teterow	3029.84	Settlement – Burgwall	Müller *et al.* 1993 Taf. 79/7
369	Berlin – Spandau Grundstück Burgwall 17	Vipperow	888.97	Settlement – Burgwall	Müller *et al.* 1993 Taf. 80/1
370	Berlin – Spandau Grundstück Burgwall 17	Vipperow	3616.40	Settlement – Burgwall	Müller *et al.* 1993 Taf. 80/7
371	Berlin – Spandau Grundstück Burgwall 17	Vipperow	3567.15	Settlement – Burgwall	Müller *et al.* 1993 Taf. 81/14
372	Berlin – Spandau Grundstück Burgwall 20	Vipperow	1904.76	Settlement – Burgwall	Müller *et al.* 1993 Taf. 87/14
373	Berlin – Spandau Grundstück Burgwall 23	Teterow	3593.29	Settlement – Burgwall	Müller *et al.* 1993 Taf. 89/8
374	Berlin – Spandau Grundstück Burgwall 23	Vipperow	4884.65	Settlement – Burgwall	Müller *et al.* 1993 Taf. 89/10
375	Berlin – Spandau Grundstück Burgwall 23	Teterow	3595.69	Settlement – Burgwall	Müller *et al.* 1993 Taf. 90/11
376	Berlin – Spandau Grundstück Burgwall 23	Teterow	9561.09	Settlement – Burgwall	Müller *et al.* 1993 Taf. 92/7
377	Berlin – Spandau Grundstück Burgwall 23	Teterow	13114.67	Settlement – Burgwall	Müller *et al.* 1993 Taf. 92/9
378	Berlin – Spandau Grundstück Burgwall 17	Teterow	4729.69	Settlement – Burgwall	Müller *et al.* 1993 Taf. 97/14
379	Berlin – Spandau Grundstück Burgwall 17	Vipperow	9110.91	Settlement – Burgwall	Müller *et al.* 1993 Taf. 98/13
380	Berlin – Spandau Grundstück Burgwall 12-14	Vipperow	4173.81	Settlement – Burgwall	Müller *et al.* 1993 Taf. 100/10
381	Berlin – Spandau Grundstück Burgwall 20	Vipperow	2948.42	Settlement – Burgwall	Müller *et al.* 1993 Taf. 106/11
382	Berlin – Spandau Grundstück Burgwall 20	Bobzin	1744.70	Settlement – Burgwall	Müller *et al.* 1993 Taf. 106/9
383	Berlin – Spandau Grundstück Burgwall 20	Bobzin	2510.13	Settlement – Burgwall	Müller *et al.* 1993 Taf. 106/8
384	Berlin – Spandau Grundstück Burgwall 23	Vipperow	3592.88	Settlement – Burgwall	Müller *et al.* 1993 Taf. 112/13
385	Berlin – Spandau Grundstück Burgwall 17	Teterow	4311.73	Settlement – Burgwall	Müller *et al.* 1993 Taf. 121/11
386	Kamień Pomorski St.1 Woj. Zachodnio – Pomorskie	Vipperow	4863.98	Settlement – Burgwall	Muzeum Narodowe in Szczecin NMS/ A/ 19.601 (W/363/1959)
387	Szczecin – Mściecino Woj. Zachodnio – Pomorskie	Menkendorf	7215.81	Settelment	Garczyński 1957 Tab. XXII/4
388	Boddin Kr. Teterow	Sukow	2830.69	Settelment – Siedlung	Faust *et al.* 1979 Taf.a Tab. 45/6/6
389	Dziedzice	Sukow	24691.79	Settelment	Dulinicz 2001 Ryc. 18/1
390	Kotowo	Sukow	2307.83	Settelemn – Siedlung	Dulinicz 2001 Ryc.13/7

391	Groß Raden Kr. Sternberg	Menkendorf	1195.78	Settlement – Siedlung	Schuldt 1981 Taf. 16/III/2365
392	Groß Raden Kr. Sternberg	Menkendorf	4310.72	Settlement – Siedlung	Schuldt 1981 Taf. 16/IV/835
393	Groß Raden Kr. Sternberg	Menkendorf	278.12	Settlement – Siedlung	Schuldt 1981 Taf. 16/III/1976
394	Groß Raden Kr. Sternberg	Menkendorf	1306.73	Settlement – Siedlung	Schuldt 1981 Taf. 16/ III/1999
395	Groß Raden Kr. Sternberg	Menkendorf	1192.76	Settlement – Siedlung	Schuldt 1981 Taf. 16/IV/861
396	Groß Raden Kr. Sternberg	Menkendorf	1926.25	Settlement – Siedlung	Schuldt 1981 Taf. 16/III/1974
397	Groß Raden Kr. Sternberg	Menkendorf	3098.87	Settlement – Siedlung	Schuldt 1981 Taf. 17/VIII/7626
398	Groß Raden Kr. Sternberg	Menkendorf	1915.50	Settlement – Siedlung	Schuldt 1981 Taf. 17/XII/689
399	Groß Raden Kr. Sternberg	Menkendorf	1249.93	Settlement – Siedlung	Schuldt 1981 Taf. 17/XII/680
400	Groß Raden Kr. Sternberg	Menkendorf	9662.23	Settlement – Siedlung	Schuldt 1981 Taf. 17/VIII/6663
401	Groß Raden Kr. Sternberg	Menkendorf	1901.34	Settlement – Siedlung	Schuldt 1981 Taf. 17/VIII/7622
402	Groß Raden Kr. Sternberg	Menkendorf	4184.07	Settlement – Siedlung	Schuldt 1981 Taf. 18/XXXIX/460
403	Groß Raden Kr. Sternberg	Menkendorf	4147.45	Settlement – Siedlung	Schuldt 1981 Taf. 18/XXXIX/421
404	Groß Raden Kr. Sternberg	Menkendorf	4233.11	Settlement – Siedlung	Schuldt 1981 Taf. 18/XXXIX/11
405	Groß Raden Kr. Sternberg	Menkendorf	1139.64	Settlement – Siedlung	Schuldt 1981 Taf. 18/XXVII/10
406	Groß Raden Kr. Sternberg	Menkendorf	3574.68	Settlement – Siedlung	Schuldt 1981 Taf. 18/XXXIX/1471
407	Groß Raden Kr. Sternberg	Menkendorf	5347.92	Settlement – Siedlung	Schuldt 1981 Taf. 26/IV/837
408	Groß Raden Kr. Sternberg	Menkendorf	4271.14	Settlement – Siedlung	Schuldt 1981 Taf. 27/IV/836
409	Groß Raden Kr. Sternberg	Menkendorf	1809.46	Settlement – Siedlung	Schuldt 1981 Taf. 32/XXXIX/8
410	Groß Raden Kr. Sternberg	Menkendorf	3058.96	Settlement – Siedlung	Schuldt 1981 Taf. 32/XXXIX/7
411	Groß Raden Kr. Sternberg	Menkendorf	1895.07	Settlement – Siedlung	Schuldt 1981 Taf. 32/XXI/12
412	Groß Raden Kr. Sternberg	Menkendorf	2420.90	Settlement – Siedlung	Schuldt 1981 Taf. 35/VIII/1748
413	Groß Raden Kr. Sternberg	Menkendorf	3011.20	Settlement – Siedlung	Schuldt 1981 Taf. 35/XXXI/145
414	Damm Kr. Rostock	Vipperow	879.24	Settelment – Siedlung	Bastian *et al.* 1973 Taf. 5/3/1
415	Damm Kr. Rostock	Vipperow	4256.58	Settelment – Siedlung	Bastian *et al.* 1973 Taf. 5/4/8
416	Thelkow Kr. Rostock	Bobzin	5371.92	Burrial – cremation	Bastian *et al.* 1973 Taf. 5/28/1
417	Alt Bartelsdorf Kr. Rostock	Vipperow	3533.82	Burrial	Bastian *et al.* 1973 Taf. 6/3/16
418	Parchim (Fst4) Kr. Parchim	Vipperow	2332.45	Settelment – Burgwall	Bastian *et al.* 1973 Taf. 13/15/1
419	Bobzin (Fst1) Kr. Lübz	Bobzin	1370.80	Settelment – Burgwall	Bastian *et al.* 1973 Taf. 14/1/2
420	Bobzin Kr. Lübz	Menkendorf	666.72	Settelment – Burgwall	Bastian *et al.* 1973 Taf. 14/2/1
421	'Fahrenhorst' – (Forst) Kr. Lübz	Feldberg	3524.58	?	Bastian *et al.* 1973 Taf. 14/12/13
422	'Fahrenhorst' – (Forst) Kr. Lübz	Menkendorf	422.68	?	Bastian *et al.* 1973 Taf. 14/12/14
423	Finkenwerder Kr. Lübz	Vipperow	7150.75	Settelment – Siedlung	Bastian *et al.* 1973 Taf. 14/14/1

424	Schönlage Kr. Sternberg	Menkendorf	1235.74	Settlemen – Siedlung	Bastian *et al.* 1973 Taf. 15/30/1
425	Ventschow Kr. Sternberg	Sukow	2210.88	Settelment – Siedlung	Bastian *et al.* 1973 Taf. 15/38/1
426	Warin Kr. Sternberg	Menkendorf	1767.77	?	Bastian *et al.* 1973 Taf. 15/44/1
427	Mühlengeez (Fst1) Kr. Güstrow	Sukow	1010.51	Settelment – Siedlung	Bastian *et al.* 1973 Taf. 17/59/1
428	Wendorf Kr. Güstrow	Bobzin	967.59	Settelment – Siedlung	Bastian *et al.* 1973 Taf. 17/81/1
429	Königsborg Kr. Burg	Sukow/ Prag	4420.19	?	Bastian *et al.* 1973 Taf. 36/26/1
430	Schwedt Kr. Schwedt	Teterow	2375.76	Settelment – Siedlung	Berlekamp *et al.* 1979 Taf. 60/1/71
431	Schwedt Kr. Schwedt	Teterow	2489.59	Settelment – Siedlung	Berlekamp *et al.* 1979 Taf. 60/1/72
432	Schwedt Kr. Schwedt	Vipperow	1884.47	Settelment – Siedlung	Berlekamp *et al.* 1979 Taf. 60/1/73
433	Schwedt Kr. Schwedt	Vipperow	933.20	Settelment – Siedlung	Berlekamp *et al.* 1979 Taf. 60/1/74
434	Alt Ruppin (Fst.2) Kr. Neuruppin	Bobzin	3694.86	Settelment – Burg	Berlekamp *et al.* 1979 Taf. 74/9/30
435	Berlin – Rudow (Fst. 6)	Prag	1286.82	Settelment – Siedlung	Berlekamp *et al.* 1979 Taf. 60/48/1
436	Vipperow Kr. Röbel	Bobzin	3113.62	Settelment – Burgwall	Schoknecht 1993 Abb. 20/a
437	Dresden-Stetzsch Kr. Riesa	Prag	1952.30	Settelemnt - Siedlung	Brachmann 1983 Abb. 12/a
438	Schwarz Kr. Neustrelitz	Feldberg	7917.93	Settelment – Siedlung	Schuldt 1971 Abb. 245/a
439	Wolde (Fpl.5) Kr. Altentrptowe	Vipperow	7898.45	Burrial – Grabe nr. 7	Schuldt 1971 Abb. 254/a
440	Schwaberow Kr. Hagenow	Menkendorf	1842.09	Settelment – Siedlung	Hollnagel 1975 Abb.2/t
441	Schwaberow Kr. Hagenow	Menkendorf	1908.70	Settelment – Siedlung	Hollnagel 1975 Abb.7/l
442	Zirzow Kr. Neubrandenburg	Weisdin	16773.14 16702.73	Settelment - Siedlungsplatz	Schoknecht 1975 Abb. 9/c
443	Zirzow Kr. Neubrandenburg	Teterow	8459.71 8417.11	Settelment - Siedlungsplatz	Schoknecht 1975 Abb. 11/h
444	Anklam Kr. Anklam	Teterow	1790.65	Settelment – Siedlung	Schoknecht 1977a Abb.28/f
445	Serams Kr. Rügen	Vipperow	537.89	?	Lampe 1978 Abb. 12/d
446	Göritz Kr. Prenzlau	Menkendorf	1886.08	Settelment – Erdkegelburg	Schoknecht 1978 Abb.4/a
447	Anklam, (Fpl. 35) Kr. Anklam	Vipperow	4144.50	Burrial – Grabe nr. 15	Schuldt 1973 Abb. 179
448	Rühlow Kr. Neubrandenburg	Feldberg	4184.80	?	Schuldt 1973 Abb. 198/b
449	Pasewalk Kr. Prenzlau	Teterow	3583.51	?	Schoknecht 1979 Abb.11/d
450	Schwanbeck Kr. Neubrandenburg	Teterow	3698.10	Settelment – Siedlung	Schoknecht 1979 Abb.22/c
451	Schwanbeck Kr. Neubrandenburg	Vipperow	1759.36	Settlement – Siedlungsplatz	Schoknecht 1979 Abb.23/b
452	Schwanbeck Kr. Neubrandenburg	Bobzin	3548.31	Settlement – Siedlungsplatz	Schoknecht 1979 Abb.23/c
454	Sudenhof Kr. Hagenow	Menkendorf	9692.98	Settlement – Siedlung	Schuldt 1974 Abb. 22/n
455	Menkin Kr. Pasewalk	Vipperow	2529.59	?	Schuldt 1974 Abb. 17/f
456	Morgenitz Kr. Wolgast	Vipperow	4258.72	Settlement – Siedlung	Lampe 1982 Abb. 3/a
457	Morgenitz Kr. Wolgast	Vipperow	852.60	Settlement – Siedlung	Lampe 1982 Abb. 3/g

458	Bardy Woj. Zachodnio – Pomorskie	Feldberg	2443.91	Settlement – Burgwall	Brather 1996 Taf. 2/11 Łosiński 1966a Abb. 3/A
459	Gołańcz Pomorski Woj. Zachodnoi – Pomorskie	Feldberg	3032.76	Settlement – Burgwall	Łosiński 1966 Abb. 1 left Brather 1996 Taf. 8/1
460	Gołańcz Pomorski Woj. Zachodnio – Pomorskie	Feldberg	3541.29	Settlement – Burgwall	Łosiński 1966 Abb. 1 right Brather 1996 Taf. 8/3
461	Gołańcz Pomorski Woj. Zachodnoi – Pomorskie	Feldberg	1723.66	Settlement – Burgwall	Brather 1996 Taf. 8/4
462	Groß Strömkendorf Kr. Wismar	Feldberg	2332.66	Settlement – Siedlung	Brather 1996 Taf. 8/4
463	Kędrzyno Woj. Zachodnio – Pomorskie	Feldberg	5531.89	Settlement – Burgwall	Brather 1996 Taf. 13/1 Urbńska 1962 Ryc. 2/d
464	Kędrzyno Woj. Zachodnio – Pomorskie	Feldberg	8480.14	Settlement – Burgwall	Brather 1996 Taf. 13/6 Urbńska 1962 Ryc. 2/a
465	Kędrzyno Woj. Zachodnio – Pomorskie	Feldberg	1233.34	Settlement – Burgwall	Brather 1996 Taf. 12/8
466	Mecklenburg Dorf Kreis Wismar	Feldberg	1751.42	Settlement – Burgwall	Brather 1996 Taf. 15/6
467	Mecklenburg Dorf Kreis Wismar	Feldberg	2494.49	Settlement – Burgwall	Brather 1996 Taf. 15/13
468	Menzlin Kr. Anklam	Feldberg	6017.92	Burial – (grave A)	Schoknecht 1977b Taf. 9/A/a Brather 1996 Taf. 17/1
469	Menzlin Kr. Anklam	Feldberg	3699.91 **3661.71**	Burial – (grave B1)	Schoknecht 1977b Taf. 9/B1/a Brather 1996 Taf. 17/2
470	Menzlin Kr. Anklam	Feldberg	4864.83 **4857.32**	Burial – (grave B2)	Schoknecht 1977b Taf. 9/B2/a Brather 1996 Taf. 17/3
471	Menzlin Kr. Anklam	Feldberg	1274.17 **1246.08**	Burial – (grave 2)	Schoknecht 1977b Taf. 9/2/a Brather 1996 Taf. 17/4
472	Menzlin Kr. Anklam	Feldberg	3564.88 **3584.64**	Burial – (grave 4b)	Schoknecht 1977b Taf. 10/4b/a Brather 1996 Taf. 17/7
473	Menzlin Kr. Anklam	Feldberg	4279.77	Burial – (grave 4b)	Schoknecht 1977b Taf. 10/4b/b Brather 1996 Taf. 17/8
474	Menzlin Kr. Anklam	Feldberg	12574.74	Burial – (grave 6)	Schoknecht 1977b Taf. 11/6/a Brather 1996 Taf. 17/9
475	Menzlin Kr. Anklam	Feldberg	3102.73	Burial – (grave 7)	Schoknecht 1977b Taf. 11/7/a Brather 1996 Taf. 17/12
476	Menzlin Kr. Anklam	Feldberg	2932.90	Burial – (grave 8)	Schoknecht 1977b Taf. 12/8/a Brather 1996 Taf. 18/1
477	Menzlin Kr. Anklam	Feldberg	3596.77	Burial – (grave 9)	Schoknecht 1977b Taf. 12/9/a Brather 1996 Taf. 18/2
478	Menzlin Kr. Anklam	Feldberg	3719.49	Burial – (grave 11)	Schoknecht 1977b Taf. 12/11/a Brather 1996 Taf. 18/3
479	Menzlin Kr. Anklam	Feldberg	7912.75	Burial – (grave 10)	Schoknecht 1977b Taf. 12/10/a Brather 1996 Taf. 18/4
480	Menzlin Kr. Anklam	Feldberg	2398.60 **2340.36**	Burial – (grave 12)	Schoknecht 1977b Taf. 13/12/a Brather 1996 Taf. 18/8
481	Menzlin Kr. Anklam	Feldberg	11437.67 **11439.94**	Burial – (grave 16)	Schoknecht 1977b Taf. 13/16/a Brather 1996 Taf. 18/9
482	Menzlin Kr. Anklam	Feldberg	4861.61	Burial – (grave 15)	Brather 1996 Taf. 18/10
483	Menzlin Kr. Anklam	Feldberg	1812.40 **1867.02**	Burial – (grave 20)	Brather 1996 Taf. 18/11 Schoknecht 1977b Taf. 14/20/a
484	Menzlin Kr. Anklam	Feldberg	3647.46 **3666.53**	Burial – (grave 29)	Brather 1996 Taf. 18/12 Schoknecht 1977b Taf. 16/29/a
485	Menzlin Kr. Anklam	Feldberg	32327.64 **32438.66**	Settelment – Burgwall	Brather 1996 Taf. 19/10 Schoknecht 1970 Abb. 152/g Schoknecht 1977b Taf. 49/57/1
486	Pasewalk Kr. Neustrelitz	Feldberg	2930.79	Settlement – Siedlung	Brather 1996 Taf. 25/10
487	Bad Sülze (Fst 1) Kr. Ribnitz-Damgarten	Menkendorf	1816.92	Settelment – Siedlung	Faust *et al.* 1979 Taf. 38/3/1
488	Barth (Fst.6) Kr. Ribnitz-Damgarten	Sukow	1796.44	Settelment – Siedlung	Faust *et al.* 1979 Taf. 38/6/5
489	Rekentin Kr. Straslund	Sukow	7178.89	?	Faust *et al.* 1979 Taf. 39/32/2
490	Tribsees Kr. Straslund	Vipperow	2910.48	Settelment – Burgwall	Faust *et al.* 1979 Taf. 39/37/19

491	Bergen Kr. Rügen	Bobzin	1788.43	Settlement – Burg	Faust *et al.* 1979 Taf. 41/16/1
492	Dumgenewitz Kr. Rügen	Bobzin	3737.96	Settelment – Siedlung	Faust *et al.* 1979 Taf. 41/56/1
493	Dummertevitz Kr. Rügen	Vipperow	2379.99	Slavic urn cemetery	Faust *et al.* 1979 Taf. 41/57/1
494	Dummertevitz Kr. Rügen	Vipperow	3513.11	Slavic urn cemetery	Faust *et al.* 1979 Taf. 41/57/2
495	Dummertevitz Kr. Rügen	Vipperow	1868.84	Slavic urn cemetery	Faust *et al.* 1979 Taf. 41/57/3
496	Dummertevitz Kr. Rügen	Vipperow	7114.72	Slavic urn cemetery	Faust *et al.* 1979 Taf. 41/57/4
497	Dummertewitz Kr. Rügen	Bobzin	3110.47	Slavic urn cemetery	Faust *et al.* 1979 Taf. 41/57/5
498	Dummertevitz Kr. Rügen	Vipperow	1752.93	Slavic urn cemetery	Faust *et al.* 1979 Taf. 41/57/6
499	Dummertevitz Kr. Rügen	Vipperow	2979.48	Slavic urn cemetery	Faust *et al.* 1979 Taf. 41/57/7
500	Dummertevitz Kr. Rügen	Vipperow	4159.58	Slavic urn cemetery	Faust *et al.* 1979 Taf. 41/57/8
501	Garftitz Kr. Rügen	Vipperow	2484.29	Settelment – Siedlung	Faust *et al.* 1979 Taf. 41/76/2
502	Garftitz Kr. Rügen	Vipperow	3629.89	Settelment – Siedlung	Faust *et al.* 1979 Taf. 41/76/3
503	Garftitz Kr. Rügen	Vipperow	6618.50	Settelment – Siedlung	Faust *et al.* 1979 Taf. 41/76/4
504	Garftitz Kr. Rügen	Teterow	3543.53	Settelment – Siedlung	Faust *et al.* 1979 Taf. 41/76/7
505	Garftitz Kr. Rügen	Weisdin	10248.12	Settelment – Siedlung	Faust *et al.* 1979 Taf. 41/76/8
506	Garftitz Kr. Rügen	Vipperow	13193.97	Settelment – Siedlung	Faust *et al.* 1979 Taf. 41/76/16
507	Garftitz Kr. Rügen	Vipperow	382.45	Settelment – Siedlung	Faust *et al.* 1979 Taf. 41/76/17
508	Gustow (Fst 12) Kr. Rügen	Vipperow	1802.78	Settelment – Siedlung	Faust *et al.* 1979 Taf. 41/122/6
509	Gustow (Fst 12) Kr. Rügen	Teterow	691.73	Settelment – Siedlung	Faust *et al.* 1979 Taf. 41/122/7
510	Gustow (Fst 12) Kr. Rügen	Vipperow	1161.41	Settelment – Siedlung	Faust *et al.* 1979 Taf. 41/122/8
511	Jarnitz Kr. Rügen	Vipperow	654.13	?	Faust *et al.* 1979 Taf. 41/131/1
512	Jasmund Kr. Rügen	Bobzin	1763.57	Settlement – Siedlung	Faust *et al.* 1979 Taf. 41/136/8
513	Jasmund Kr. Rügen	Teterow	1214.21	Settlement – Siedlung	Faust *et al.* 1979 Taf. 41/136/10
514	Jasmund Kr. Rügen	Vipperow	953.48	Settlement – Siedlung	Faust *et al.* 1979 Taf. 41/136/11
515	Jasmund Kr. Rügen	Vipperow	631.30	Settlement – Siedlung	Faust *et al.* 1979 Taf. 41/136/12
516	Kowall (Fst. 1) Kr. Rügen	Vipperow	4172.73	Settlement – Siedlung	Faust *et al.* 1979 Taf. 41/160/4
517	Lancken-Granitz Kr. Rügen	Teterow	3030.84	?	Faust *et al.* 1979 Taf. 41/181/48
518	Nadelitz Kr. Rügen	Vipperow	2360.62	Settelment – Siedlungsgruben	Faust *et al.* 1979 Taf. 41/210/7
519	Neklade Kr. Rügen	Vipperow	1209.57	?	Faust *et al.* 1979 Taf. 41/220/1
520	Peseritz Kr. Rügen	Teterow	451.92	?	Faust *et al.* 1979 Taf. 41/247/1
521	Pulitz Kr. Rügen	Bobzin	3080.40	Settelment – Siedlung	Faust *et al.* 1979 Taf. 41/265/10
522	Pulitz Kr. Rügen	Bobzin	3018.88	Settelment – Siedlung	Faust *et al.* 1979 Taf. 41/265/11
523	Putbus Kr. Rügen	Bobzin	3601.00	Settelment – Burg	Faust *et al.* 1979 Taf. 41/271/1

524	Rügen Kr. Rügen	Vipperow	882.03	Settelment – Burgwall	Faust *et al.* 1979 Taf. 41/428/1
525	Rügen Kr. Rügen	Vipperow	886.89	Settelment – Burgwall	Faust *et al.* 1979 Taf. 41/428/2
526	Rügen Kr. Rügen	Vipperow	659.46	Settelment – Burgwall	Faust *et al.* 1979 Taf. 41/428/3
527	Rügen Kr. Rügen	Bobzin	2323.22	Settelment – Burgwall	Faust *et al.* 1979 Taf. 41/428/4
528	Rügen Kr. Rügen	Bobzin	2928.62	Settelment – Burgwall	Faust *et al.* 1979 Taf. Ryc. 41/428/5
529	Rügen Kr. Rügen	Teterow	2456.75	Settelment – Burgwall	Faust *et al.* 1979 Taf. 41/429/1
530	Rügen Kr. Rügen	Teterow	614.54	Settelment – Burgwall	Faust *et al.* 1979 Taf. 41/429/2
531	Grimmen Kr. Grimmen	Sukow	2711.70	Settelment – Stadt	Faust *et al.* 1979 Taf. 42/9
532	Grimmen (Fst.5) Kr. Grimmen	Feldberg	12018.59	Settelment – Stadt	Faust *et al.* 1979 Taf. 42/9/32
533	Dambeck (Fst.2) Kr. Greifswald	Feldberg	2965.27	Settelment – Burgwall	Faust *et al.* 1979 Taf. 43/21/3
534	Dambeck (Fst.2) Kr. Greifswald	Feldberg	3570.40	Settelment – Burgwall	Faust *et al.* 1979 Taf. 43/21/2
535	Dargen (Fst.1) Kr. Wolgast	Weisdin	15350.19	Settelment – Siedlung	Faust *et al.* 1979 Taf. 44/16/1
536	Dargen (Fst.1) Kr. Wolgast	Weisdin	5553.32	Settelment – Siedlung	Faust *et al.* 1979 Taf. 44/16/2
537	Stolpe (Fst.2) Kr. Wolgast	Feldberg	3693.39	Settelment – Burg	Faust *et al.* 1979 Taf. 44/150/10
538	Usedom (Fst.2) Kr. Wolgast	Teterow	3680.62	Settelment – Burgwall	Berlekamp *et al.* 1979 Taf. 44/177/61
539	Usedom (Fst.3) Kr. Wolgast	Teterow	8340.65	Settelment – Burgwall	Faust *et al.* 1979 Taf. 44/178/116
540	Usedom (Fst.3) Kr. Wolgast	Teterow	8403.99	Settelment – Burgwall	Faust *et al.* 1979 Taf. 44/178/221
541	Usedom (Fst.3) Kr. Wolgast	Vipperow	3099.37	Settelment – Burgwall	Faust *et al.* 1979 Taf. 44/178/226
542	Usedom (Fst.3) Kr. Wolgast	Teterow	4796.49	Settelment – Burgwall	Faust *et al.* 1979 Taf. 44/178/339
543	Usedom (Fst.3) Kr. Wolgast	Vipperow	10720.92	Settelment – Burgwall	Faust *et al.* 1979 Taf. 44/178/349
544	Usedom (Fst.3) Kr. Wolgast	Teterow	3563.20	Settelment – Burgwall	Faust *et al.* 1979 Taf. 44/178/378
545	Usedom (Fst.3) Kr. Wolgast	Teterow	10949.03	Settelment – Burgwall	Faust *et al.* 1979 Taf. 44/178/303
546	Usedom (Fst.3) Kr. Wolgast	Vipperow	2340.93	Settelment – Burgwall	Faust *et al.* 1979 Taf. 44/178/293
547	Görke (Fst.5) Kr. Anklam	Feldberg	1175.04	Settelment – Siedlungsgebiet	Faust *et al.* 1979 Taf. 49/53/6
548	Görke (Fst.1) Kr. Anklam	Feldberg	3052.51	Settelment – Siedlungsgebiet	Faust *et al.* 1979 Taf. 49/49/5
549	Anklam (Fst.35) Kr. Anklam	Vipperow	4209.11	Settelment – Siedlung	Faust *et al.* 1979 Taf. 49/6/22
550	Anklam (Fst.38) Kr. Anklam	Feldberg	11518.75	Settelment – Siedlung	Faust *et al.* 1979 Taf. 49/4/1
551	Letzin Kr. Altentreptow	Weisdin	19871.44	Settelment – Siedlng	Faust *et al.* 1979 Taf. 48/64/4
552	Groß Teetzleben Kr. Altentreptow	Teterow	1231.14	Settelment – Siedlungsgrube	Faust *et al.* 1979 Taf. 48/43/1
553	Sanzkow Kr. Demmin	Woldegk	4200.92	Settelment – Siedlung	Faust *et al.* 1979 Taf. 47/57/72
554	Groß Zastrow Kr. Demmin	Menkendorf	2424.64	Settelment – Siedlung	Faust *et* al. 1979 Taf. 47/36/2
555	Demmin Kr. Demmin	Teterow	3588.61	Settelment – Burgwall	Faust *et* al. 1979 Taf. 47/25
556	Gielow Kr. Malchin	Menkendorf	1778.90	Settlement – Siedlung	Faust *et* al. 1979 Taf. 46/30/5

557	Gielow Kr. Malchin	Feldberg	1841.02	Settlement – Siedlung	Faust *et a*l. 1979 Taf. 46/31/4
558	Gielow Fst.4 Kr. Malchin	Sukow	11824.89	Settlement – Siedlung	Faust *et a*l. 1979 Taf. 46/22/1
559	Dargun Fst.3 Kr. Malchin	Feldberg	7761.87	Settelment – Siedlung or Burgwall	Faust *et a*l. 1979 Taf. 46/11/10
560	Sukow Fst.1 Kr. Teterow	Feldberg	4833.14	Settelment – Burgwall	Faust *et a*l. 1979 Taf. 45/70/41
561	Klein Markow Fst.2 Kr. Teterow	Sukow	6142.62	Settelment – Burg	Faust *et a*l. 1979 Taf. 45/36/1
562	Klein Markow Fst.2 Kr. Teterow	Sukow	6936.15	Settelment – Burg	Faust *et a*l. 1979 Taf. 45/36/2
563	Klein Markow Fst.2 Kr. Teterow	Feldberg	2537.62	Settelment – Burg	Faust *et a*l. 1979 Taf. 45/36/3
564	Klein Markow Fst.2 Kr. Teterow	Feldberg	948.08	Settelment – Burg	Faust *et a*l. 1979 Taf. 45/36/4
565	Küsserow Kr. Teterow	Bobzin	2406.76	Settelment – Burgwall	Faust *et a*l. 1979 Taf. 45/41
566	Wolgast Fst.3 Kr. Wolgast	Feldberg	4917.02	Settelment – Burgwall	Faust *et a*l. 1979 Taf. 44/217/1
567	Wolgast Fst.3 Kr. Wolgast	Feldberg	3614.60	Settelment – Burgwall	Faust *et a*l. 1979 Taf. 44/217/2
568	Görke ot von Anklam Fst.3 Kr. Anklam	Sukow	2531.13	Settelment – Siedlungsgebiet	Faust *et a*l. 1979 Taf. 49/55/6
569	Görke ot von Anklam Fst.3 Kr. Anklam	Feldberg	3098.52	Settelment – Siedlungsgebiet	Faust *et a*l. 1979 Taf. 49/55/7
570	Görke ot von Anklam Fst.7 Kr. Anklam	Fresendorf	2679.61	Settelment – Siedlungsgebiet	Faust *et a*l. 1979 Taf. 49/56/8
571	Görke ot von Anklam Fst.7 Kr. Anklam	Menkendorf	4751.27	Settelment – Siedlungsgebiet	Faust *et a*l. 1979 Taf. 49/56/9
572	Görke ot von Anklam Fst.7 Kr. Anklam	Sukow	3661.47	Settelment – Siedlungsgebiet	Faust *et a*l. 1979 Taf. 49/5/1
573	Menzlin Fst.3 Kr. Anklam	Feldberg	4247.89	Settelment – Burgwall	Faust *et a*l. 1979 Taf. 49/12/14
574	Menzlin Fst.3 Kr. Anklam	Feldberg	5403.15	Settelment – Burgwall	Faust *et a*l. 1979 Taf. 49/12/1
575	Putzar Kr. Anklam	Feldberg	927.54	?	Faust *et a*l. 1979 Taf. 49/135/1
576	Rollwitz Fst.4 Kr. Pasewalk	Vipperow	2479.51	Settelment – Siedlung	Berlekamp *et al*. 1979 Taf. 52/171/1
577	Schwennenz Kr. Pasewalk	Menkendorf	12151.94	Settelment – Burgwall	Berlekamp *et al*. 1979 Taf. 52/205/12
578	Ramin Kr. Pasewalk	Vipperow	10241.14	Settelment – Siedlng	Berlekamp *et al*. 1979 Taf. 52/163/6
579	Ramin Kr. Pasewalk	Vipperow	15636.05	Settelment – Siedlng	Berlekamp *et al*. 1979 Taf. 52/163/7
580	Ramin Kr. Pasewalk	Vipperow	629.48	Settelment – Siedlng	Berlekamp *et al*. 1979 Taf. 52/163/1
581	Ramin Kr. Pasewalk	Vipperow	1823.51	Settelment – Siedlng	Berlekamp *et al*. 1979 Taf. 52/163/2
582	Ramin Kr. Pasewalk	Vipperow	2381.57	Settelment – Siedlng	Berlekamp *et al*. 1979 Taf. 52/163/3
583	Ramin Kr. Pasewalk	Vipperow	7214.71	Settelment – Siedlng	Berlekamp *et al*. 1979 Taf. 52/163/4
584	Ramin Kr. Pasewalk	Vipperow	2966.24	Settelment – Siedlng	Berlekamp *et al*. 1979 Taf. 52/163/5
585	Paselwak Kr. Pasewalk	Vipperow	3557.93	?	Berlekamp *et al*. 1979 Taf. 52/107/3
586	Alt Käbelich Kr. Mecklenburg-Strelitz	Menkendorf	598.67 613.60	Burial – (grave 1)	Schmidt 1996 Abb. 8/a
587	Alt Käbelich Kr. Mecklenburg-Strelitz	Menkendorf	2361.58 2312.55	Burial – (grave 12)	Schmidt 1996 Abb. 8/l
588	Alt Käbelich Kr. Mecklenburg-Strelitz	Woldegk	2456.11 2427.59	Burial – (grave 12)	Schmidt 1996 Abb. 8/k
589	Alt Käbelich Kr. Mecklenburg-Strelitz	Vipperow	1732.34 1786.84	Burial – (grave 7)	Schmidt 1996 Abb. 9/i

590	Alt Käbelich Kr. Mecklenburg-Strelitz	Menkendorf	3008.34 2974.29	Burial – (grave 7)	Schmidt 1996 Abb. 9/k
591	Alt Käbelich Kr. Mecklenburg-Strelitz	Menkendorf	2387.91 2420.26	Burial – (grave 7)	Schmidt 1996 Abb. 9/j
592	Alt Käbelich Kr. Mecklenburg-Strelitz	Teterow	2410.27 2394.64	Burial – (grave 35)	Schmidt 1996 Abb. 11/c
593	Alt Käbelich Kr. Mecklenburg-Strelitz	Woldegk	4658.35 4654.31	Burial – (grave 35)	Schmidt 1996 Abb. 11/d
594	Alt Käbelich Kr. Mecklenburg-Strelitz	Woldegk	2256.56 2243.67	Burial – (grave 35)	Schmidt 1996 Abb. 11/f
595	Alt Käbelich Kr. Mecklenburg-Strelitz	Woldegk	10636.75 10831.25	Burial – (grave 35)	Schmidt 1996 Abb. 11/g
596	Alt Käbelich Kr. Mecklenburg-Strelitz	Menkendorf	2373.58 2317.75	Settelement – Ustrine I	Schmidt 1996 Abb. 12/f
597	Alt Käbelich Kr. Mecklenburg-Strelitz	Menkendorf	1779.22 1821.07	Settelement – Ustrine I	Schmidt 1996 Abb. 12/h
598	Alt Käbelich Kr. Mecklenburg-Strelitz	Menkendorf	1195.45 1235.38	Settelement – Ustrine II	Schmidt 1996 Abb. 13/b
599	Alt Käbelich Kr. Mecklenburg-Strelitz	Menkendorf	1834.90 1778.73	Settelement – Ustrine II	Schmidt 1996 Abb. 13/c
600	Alt Käbelich Kr. Mecklenburg-Strelitz	Menkendorf	2398.08 2375.12	Settelement – Ustrine II	Schmidt 1996 Abb. 13/f
601	Alt Käbelich Kr. Mecklenburg-Strelitz	Woldegk	2901.06 2936.38	Burial – (grave 33)	Schmidt 1996 Abb. 11/e
602	Alt Käbelich Kr. Mecklenburg-Strelitz	Menkendorf	613.69	Burial – (grave 10)	Schmidt 1996 Abb. 8/e
603	Marlow Fst. 8 Kr. Ribnitz-Damagarten	Fresendorf	2455.39	Settelment – Burg und Wiek	Hollnagel 1974 Abb. 11/a
604	Schwennznz Kr. Anklam	Teterow	636.09	Burial – (grave 1)	Dräge, Schoknecht 1969 Abb. 170/b
605	Bagemühl Kr. Anklam	Vipperow	586.07	Burial	Dräger, Schoknecht 1969 Abb. 170/f
606	Dümmer Kr. Schwerin	Menkendorf	2388.79	Settlement – Inselsiedlung	Wietrzichowski 1991 Abb. 9/a
607	Dümmer Kr. Schwerin	Menkendorf	1765.35	Settlement – Inselsiedlung	Wietrzichowski 1991 Abb. 9/b
608	Neuenkirchen Kr. Neubrandenburg	Menkendorf	3569.58	Settelment – Siedlungsgrube	Schoknecht 1975 Abb. 4/i
609	Neuenkirchen Kr. Neubrandenburg	Teterow	2410.26	Settelment – Siedlungsgrube	Schoknecht 1975 Abb. 4/h
610	Tornow "Borchelt" Kr. Calau	Teterow	4764.89	Settlement – Siedlung	Herrmann 1973 Abb. 29/234 lower
611	Dessau-Mosigkau	Prag	2737.48	Settelment – Siedlung	Brachmann 1983 Abb. 7/a
612	Dessau-Mosigkau	Prag	1264.79	Settelment – Siedlung	Brachmann 1983 Abb. 7/b
613	Dessau-Mosigkau	Prag	1519.09	Settelment – Siedlung	Brachmann 1983 Abb. 7/c
614	Dessau-Mosigkau	Prag	2436.71	Settelment – Siedlung	Brachmann 1983 Abb. 7/g
615	Groß Zöberitz	Prag	4337.46	Settelment – Siedlung	Brachmann 1983 Abb. 7/d
616	Groß Zöberitz	Prag	2482.82	Settelment – Siedlung	Brachmann 1983 Abb. 7/e
617	Dessau-Mosigkau	Prag	3450.66	Settelment – Siedlung	Brachmann 1983 Abb. 8/a
618	Dessau-Mosigkau	Prag	3282.51	Settelment – Siedlung	Brachmann 1983 Abb. 8/b
619	Dessau-Mosigkau	Prag	1744.75	Settelment – Siedlung	Brachmann 1983 Abb. 8/c
620	Dessau-Mosigkau	Prag	2173.16	Settelment – Siedlung	Brachmann 1983 Abb. 8/d
621	Dessau-Mosigkau	Prag	3058.95	Settelment – Siedlung	Brachmann 1983 Abb. 8/e
622	Darz Kr. Rügen	Teterow	1276.95	?	Lüth, Schoknecht 1998 Abb. 145

623	Klemensker Kr. Bornholm	Teterow	2418.56	Hoard	Liebgott 1978 Fig. 24/a
624	Rützenfelde Kr. Demmin	Fresendorf	4256.23	?	Lüth, Schoknecht 1998 Abb. 131/f
625	Groß Teetzleben Kr. Altentreptow	Vipperow	1314.58	Settelment – Siedlungsgrube	Schoknecht 1969 Abb. 193/a
626	Hildebrandshagen Kr. Strasburg	Menkendorf	1917.58	Settelment - Siedlungsgrube	Schoknecht 1969 Abb. 194/a
627	Rattey Kr. Neubrandenburg	Feldberg	6712.43	Settelment – Siedlung	Schoknecht 1984 Abb. 32/a
628	Gde. Dassendorf Kr. Herzogtum Lauenburg	Sukow	1411.51	?	Schmid-Hecklau 2002 Taf. 1/12
629	Gde. Panten Siedlung LA1 Kr. Herzogtum Lauenburg	Sukow	2594.37	Settelment – Siedlung	Schmid-Hecklau 2002 Taf. 69/10
630	Gde. Horst Burg LA3 Kr. Herzogtum Lauenburg	Sukow	6283.68	Settelment – Burg	Schmid-Hecklau 2002 Taf. 36/3
631	Mecklemburg	Sukow	2411.22	Settelment – Hauptburg	Donat 1984 Abb. 47/6
632	Mecklemburg	Sukow	1720.31	Settelment – Hauptburg	Donat 1984 Abb. 47/7
633	Mecklemburg	Sukow	2764.93	Settelment – Hauptburg	Donat 1984 Abb. 48/3
634	Mecklemburg	Menkendorf	1205.62	Settelment – Hauptburg	Donat 1984 Abb. 50/14
635	Mecklemburg	Vipperow	12461.05	Settelment – Hauptburg	Donat 1984 Abb. 55/1
636	Natzevitz Fpl.15 Kr. Rügen	Teterow	6121.95	Settlement – Siedlungsgruben	Lampe 1983 Abb. 2/a
637	Natzevitz Fpl.15 Kr. Rügen	Teterow	12712.67	Settlement – Siedlungsgruben	Lampe 1983 Abb. 2/b
638	Natzevitz Fpl.15 Kr. Rügen	Teterow	3624.18	Settlement – Siedlungsgruben	Lampe 1983 Abb. 3/d
639	Natzevitz Fpl.15 Kr. Rügen	Teterow	688.75	Settlement – Siedlungsgruben	Lampe 1983 Abb. 3/e
640	Natzevitz Fpl.15 Kr. Rügen	Vipperow	1751.60	Settlement – Siedlungsgruben	Lampe 1983 Abb. 3/b
641	Natzevitz Fpl.15 Kr. Rügen	Teterow	2954.63	Settlement – Siedlungsgruben	Lampe 1983 Abb. 4/a
642	Natzevitz Fpl.15 Kr. Rügen	Teterow	1902.18	Settlement – Siedlungsgruben	Lampe 1983 Abb. 4/d
643	Usadel Fpl. 33 Kr. Neustrelitz	Teterow	682.18	Burrial – tomb Gräber nr. 77	Schmidt 1992 Taf. 37/77
644	Usadel Kr. Neustrelitz	Vipperow	3025.22	Burrial – tomb Gräber nr. 102	Schmidt 1992 Taf. 42/102
645	Usadel Kr. Neustrelitz	Teterow	4290.44	Settelment – Stelle E	Schmidt 1992 Taf. 46/l
646	Zachow Kr. Neubrandenburg	Vipperow	984.39	Burrial – tomb Gräber nr. 5	Schmidt 1992 Taf. 49/5/j
647	Zachow Kr. Neubrandenburg	Woldegk	3362.02	Burrial – Grab nr. 8	Schmidt 1992 Taf. 51/8/d
648	Neubrandenburg Fst. 34 Kr. Neubrandenburg	Feldberg	2511.82	Settelment – Burgwall	Schmidt 1984 Taf. 19/s
649	Neubrandenburg Fst. 34 Kr. Neubrandenburg	Feldberg	2369.90	Settelment – Burgwall	Schmidt 1984 Taf. 19/t
650	Neubrandenburg Fst. 35 Kr. Neubrandenburg	Feldberg	676.61	Settelment – Siedlung with central charcter	Schmidt 1984 Taf. 19/u
651	Neubrandenburg Fst. 35 Herstelle C Kr. Neubrandenburg	Menkendorf	368.61	Settelment	Schmidt 1984 Taf. 19/aa
652	Neubrandenburg Fst. 34	Fresendorf	1776.13	Settelment – Burgwall	Schmidt 1984 Taf. 20/a
653	Neubrandenburg Fst. 34 Kr. Neubrandenburg	Woldegk	2866.54	Settelment – Burgwall	Schmidt 1984 Taf. 20/e
654	Neubrandenburg Fst. 36 Kr. Neubrandenburg	Woldegk	4866.39	Settelment – Siedlung with central	Schmidt 1984 Taf. 20/d

				charcter	
655	Neubrandenburg Fst. 36 Kr. Neubrandenburg	Vipperow	4854.04	Settelment – Siedlung with central charcter; house nr. 4	Schmidt 1984 Taf. 21/a
656	Neubrandenburg Fst. 36 Kr. Neubrandenburg	Vipperow	3086.72	Settelment – Siedlung with central charcter; house nr. 4	Schmidt 1984 Taf. 21/b
657	Neubrandenburg Fst. 36 Kr. Neubrandenburg	Vipperow	4739.43	Settelment – Siedlung with central charcter	Schmidt 1984 Taf. 21/c
658	Neubrandenburg Fst. 36 Kr. Neubrandenburg	Vipperow	2524.56	Settelment – Siedlung with central charcter	Schmidt 1984 Taf. 21/d
659	Neubrandenburg Fst. 36 Kr. Neubrandenburg	Vipperow	6512.06	Settelment – Siedlung with central charcter	Schmidt 1984 Taf. 21/e
660	Neubrandenburg Fst. 36 Kr. Neubrandenburg	Vipperow	3024.67	Settelment – Siedlung with central charcter	Schmidt 1984 Taf. 22/b
661	Neubrandenburg Fst. 36 Kr. Neubrandenburg	Vipperow	1827.09	Settelment – Siedlung with central charcter	Schmidt 1984 Taf. 22/c
662	Neubrandenburg Fst. 36 Kr. Neubrandenburg	Vipperow	2451.14	Settelment – Siedlung with central charcter	Schmidt 1984 Taf. 22/d
663	Neubrandenburg Fst. 36 Kr. Neubrandenburg	Vipperow	2409.61	Settelment – Siedlung with central charcter	Schmidt 1984 Taf. 22/ e
664	Neubrandenburg Fst. 36 Kr. Neubrandenburg	Teterow	4309.54	Settelment – Siedlung with central charcter	Schmidt 1984 Taf. 23/h
665	Neubrandenburg Fst. 36 Kr. Neubrandenburg	Weisdin	11230.94	Settelment – Siedlung with central charcter; house nr. 4	Schmidt 1984 Taf. 23/j
666	Neubrandenburg Fst. 36 Kr. Neubrandenburg	Weisdin	8814.18	Settelment – Siedlung with central charcter	Schmidt 1984 Taf. 26/f
667	Groß Raden Kr. Sternberg	Woldegk	4544.87	Settlement – Siedlung	Schuldt 1981 Taf. 56/b
668	Groß Raden Kr. Sternberg	Menkendorf	3042.82	Settlement – Siedlung	Schuldt 1981 Taf. 56/a
669	Groß Raden Kr. Sternberg	Menkendorf	441.20	Settlement – Siedlung	Schuldt 1981 Taf. 62/o
670	Groß Raden Kr. Sternberg	Teterow	6661.94	Settlement – Siedlung	Schuldt 1981 Taf. 72/d
671	Groß Raden Kr. Sternberg	Teterow	10214.28	Settlement – Siedlung	Schuldt 1981 Taf. 72/e
672	Neubrandenburg Fst. 36 Kr. Neubrandenburg	Weisdin	4742.11	Settelment – Siedlung with central charcter	Schmidt 1984 Taf. 24/b
673	Mecklenburg	Fresendorf	2930.67	Settelment – Hauptburg	Donat 1984 Abb. 17/1
674	Mecklenburg	Fresendorf	2901.31	Settelment – Hauptburg	Donat 1984 Abb. 17/2
675	Alt Lübeck	Vipperow	1795.52	Settelment – Burgwall	Kempke 1984b Abb. 8/5
676	Alt Lübeck	Vipperow	3045.50	Settelment – Burgwall	Kempke 1984b Abb. 8/7
677	Alt Lübeck	Vipperow	3031.93	Settelment – Burgwall	Kempke 1984b Abb. 8/8
678	Alt Lübeck	Teterow	1789.97	Settelment – Burgwall	Kempke 1984b Abb.9/5
679	Alt Lübeck	Teterow	2366.60	Settelment – Burgwall	Kempke 1984b Abb. 9/6
680	Alt Lübeck	Teterow	1196.40	Settelment – Burgwall	Kempke 1984b Abb. 10/6
681	Alt Lübeck	Sukow	1414.00	Settelment – Burgwall	Kempke 1980 Abb. 1/8

682	Menzlin Kr. Anklam	Feldberg	5946.16	Burial – (grave 7)	Schoknect 1977b Taf. 14/17/a
683	Menzlin Kr. Anklam	Feldberg	3027.56	Burial – (grave 28)	Schoknect 1977b Taf. 15/28/a
684	Nünchritz Kr. Riesa	Prag	1643.32	Settelment – Siedlung	Brachmann 1983 Abb. 12/d
685	Woserow Kr. Anklam	Weisdin	8881.40	Settelment – Siedlung	Faust *et a*l. 1979 Taf. 49/171/30
686	Woserow Kr. Anklam	Vipperow	2150.34	Settelment – Siedlung	Faust *et a*l. 1979 Taf. 49/171/31
687	Stargard Fst.14 Kr. Neubrandenburg	Bobzin	1743.43	Settelment – Burgwall	Faust *et a*l. 1979 Taf. 50/24/1
688	Cammin Fst. 11 Kr. Neubrandenburg	Fresendorf	3172.54	Settelment – Siedlung	Faust *et a*l. 1979 Taf. 50/32/3
689	Friedberg Kr. Neubrandenburg	Sukow	7528.71	?	Faust *et a*l. 1979 Taf. 50/47/1
690	Neubrandenburg Fst.87 Kr. Neubrandenburg	Vipperow	3046.11	Settelment – Siedlung	Berlekamp *et al*. 1979 Taf. 50/162/17
691	Neubrandenburg Fst.87 Kr. Neubrandenburg	Vipperow	8511.71	Settelment – Siedlung	Berlekamp *et al*. 1979 Taf. 50/162/18
692	Neuenkirchen Kr. Neubrandenburg	Menkendorf	4181.68	Settelment – Siedlung	Berlekamp *et al*. 1979 Taf. 50/180/4
693	Neuenkirchen Kr. Neubrandenburg	Vipperow	2982.43	Settelment – Siedlung	Berlekamp *et al*. 1979 Taf. 50/180/7
694	Ramelow Fst.5 Kr. Neubrandenburg	Menkendorf	2982.29	Settelment – Siedlng	Berlekamp *et al*. 1979 Taf. 50/200/1
695	Rühlow Kr. Neubrandenburg	Feldberg	5518.70	Settelment – Burg	Berlekamp *et al*. 1979 Taf. 50/217/8
696	Fahrenwalde Fst.1 Kr. Pasewalk	Menkendorf	6595.96	Settelment – Burg	Berlekamp *et al*. 1979 Taf. 52/39/20
697	Schwennze Fst.17 Kr. Pasewalk	Vipperow	7153.28	Settelment – Burgwall	Faust *et a*l. 1979 Taf. 52/208/1
698	Hildebrandshagen Fst.6 Kr. Strasburg	Menkendorf	1771.13	Settlement – Siedlung	Berlekamp *et al*. 1979 Taf. 53/22/22
699	Neuhaus Kr. Strasburg	Vipperow	8446.87	Settlement – Siedlung	Berlekamp *et al*. 1979 Taf. 53/34/1
700	Weisdin Kr. Neustrelitz	Weisdin	28303.42	Settlement – Siedlung	Berlekamp *et al*. 1979 Taf. 56/141/2
701	Feldberg Fst.3 Kr. Neustrelitz	Feldberg	9648.95	Settelment – Burgwall	Berlekamp *et al*. 1979 Taf. 56/45/1
702	Feldberg Kr. Neustrelitz	Menkendorf	3142.74	Settelment – Burgwall	Berlekamp *et al*. 1979 Taf. 56/49/1
703	Klein Luckow Kr. Waren	Woldegk	9178.38	Settelment – Burg	Berlekamp *et al*. 1979 Taf. 57/22/1
704	Waren Fst.14 Kr. Waren	Vipperow	14356.22	Settelment – Burgwall	Berlekamp *et al*. 1979 Taf. 57/80/57
705	Waren Fst.14 Kr. Waren	Vipperow	6551.05	Settelment – Burgwall	Berlekamp *et al*. 1979 Taf. 57/80/58
706	Waren Fst.30 Kr. Waren	Vipperow	5326.80	Settelment – Burgwall	Berlekamp *et al*. 1979 Taf. 57/81/24
707	Waren Fst.30 Kr. Waren	Vipperow	12079.02	Settelment – Burgwall	Berlekamp *et al*. 1979 Taf. 57/81/25
708	Waren Fst.30 Kr. Waren	Vipperow	3652.07	Settelment – Burgwall	Berlekamp *et al*. 1979 Taf. 57/81/26
709	Waren Fst.56 Kr. Waren	Woldegk	3476.08	Settelment – Burgwall	Berlekamp *et al*. 1979 Taf. 57/85/1
710	Waren Fst.56 Kr. Waren	Teterow	2391.51	Settelment – Burgwall	Berlekamp *et al*. 1979 Taf. 57/85/2
711	Wustrow Kr. Waren	Menkendorf	1867.88	Settelment – Siedlung	Berlekamp *et al*. 1979 Taf. 57/100/1
712	Nienhagen Kr. Straslund	Menkendorf	392.98	Settlement – Siedlung	Schuldt 1956 Abb. 10/i
713	Dumgenewitz Kr. Rügen	Bobzin	3654.96	Settelment – Siedlung	Schuldt 1956 Abb. 44/a
714	Scharpitz Kr. Putbus	Bobzin	1776.43	?	Schuldt 1956 Abb. 44/b

715	Jasmund Kr. Bergen	Bobzin	1792.88	Settlement – Siedlung	Schuldt 1956 Abb. 44/c
716	Bobzin Kr. Lübz	Bobzin	1725.32	Settelment – Burgwall	Schuldt 1956 Abb. 44/d
717	Küsserow Kr. Teterow	Bobzin	2846.51	Settelment – Burgwall	Schuldt 1956 Abb. 44/e
718	Nünchritz Kr. Riesa	Prag	2918.95	Settelment – Siedlung	Brachmann 1983 Abb. 12/f
719	Sausedlitz Kr. Delitzsch	Prag	2093.39	?	Brachmann 1983 Abb. 14/d
720	Paußnitz Kr. Riesa	Prag	3949.62	?	Brachmann 1983 Abb. 14/e
721	Dessau-Mosigkau	Sukow	6913.47	Settelment – Siedlung	Hoffmann 1959 Abb. 6/a
722	Dessau-Mosigkau	Sukow	7323.01	Settelment – Siedlung	Hoffmann 1959 Abb. 6/b
723	Mutzschen Kr. Grimma	Sukow	1448.85	Settelment – Siedlung	Baumann 1961 Abb. 1/2
724	Mutzschen Kr. Grimma	Sukow	903.15	Settelment – Siedlung	Baumann 1961 Abb. 1/3
725	Mutzschen Kr. Grimma	Sukow	941.45	Settelment – Siedlung	Baumann 1961 Abb. 1/4
726	Usedom Kr. Wolgast	Teterow	3038.01	Settelment – 'SeaBorg'	Hollnagel 1964 Taf. 30/b
727	Usedom Kr. Wolgast	Teterow	3673.45	Settelment – 'SeaBorg'	Hollnagel 1964 Taf. 30/c
728	Usedom Kr. Wolgast	Teterow	1153.48	Settelment – 'SeaBorg'	Hollnagel 1964 Taf. 32/i
729	Garftitz Kr. Rügen	Teterow	7132.98	Settelment – Siedlung	Hollnagel 1964 Taf. 31/d
730	Cramonshagen Kr. Schwerin	Sukow	4338.93	Settelment – Siedlung	Keiling 1965 Abb. 1/m
731	Eulenau Kr. Torgau	Menkendorf	1761.38	Settelment – Siedlung	Baumann 1977 Abb. 3/7
732	Eulenau Kr. Torgau	Menkendorf	5982.99	Settelment – Siedlung	Baumann 1977 Abb. 4/11
733	Bardy Woj. Zachodnio – Pomorskie	Feldberg	3694.48	Settelment – Burgwall	Łosiński 1966a Ryc. 3/B
734	Świelubie Woj. Zachodnio – Pomorskie	Feldberg	4223.38	?	Łosiński 1965 Ryc. 1/a
735	Świelubie Woj. Zachodnio – Pomorskie	Feldberg	481.36 483.82	Burial – (grave 36)	Łosiński 1965 Ryc. 1/b Brather 1996 Taf. 34/4
736	Świelubie Pow. Kołobrzeg	Feldberg	1304.07	Burial – (grave 10)	Brather 1996 Taf. 34/3 Łosiński 1968 Ryc. 6/b
737	Świelubie Woj. Zachodnio – Pomorskie	Feldberg	1161.49 1121.59	Burial – (grave 24)	Łosiński 1965 Ryc. 3/a Brather 1996 Taf. 34/9
738	Świelubie Woj. Zachodnio – Pomorskie	Feldberg	3567.50	Burial – (grave 39)	Łosiński 1965 Ryc. 3/2/a Brather 1996 Taf. 34/2
739	Tornow "Borchelt" Kr. Calau	Teterow	1153.01	Settlement – Siedlung	Herrmann 1973 Abb. 29/234 upper
740	Wolin Woj. Zachodnio – Pomorskie	Weisdin	5391.96	Settlement – town	Lüdke, Schietze 2001 Taf. 292/3
741	Wolin Woj. Zachodnio – Pomorskie	Weisdin	8655.08	Settlement – town	Lüdke, Schietze 2001 Taf. 292/9
742	Wolin – Port St.1 wykop 8 Woj. Zachodnio – Pomorskie	Woldegk	3769.75	Settlement – town	Stanisławski 1998 Ryc. 4.5/a
743	Jarszewo 3 Woj. Zachodnio – Pomorskie	Weisdin	22610.36	Settelment – osada otwarta	Rogosz 1966 Tab. VII/1
744	Jarszewo 3 Woj. Zachodnio – Pomorskie	Teterow	23610.36	Settelment – osada otwarta	Rogosz 1966 Tab. XVIII/2
745	Kützerhof Kr. Machlin	Vipperow	8988.65	Settelment – Siedlng	Schoknecht 1986 Abb. 7/k
746	Mścięcino Woj. Zachodnio – Pomorskie	Menkendorf	2984.01	Settelment	Muzeum Narodowe in Szczecin MNS A/11.586 (W/74/54)
747	Szczecin – Mściecino Woj. Zachodnio – Pomorskie	Menkendorf	4238.19	Settelment	Garczyński 1957 Tab. XXII/5

748	Szczecin – Mściecino Woj. Zachodnio – Pomorskie	Menkendorf	1904.69	Settelment	Garczyński 1957 Tab. XXI/5
749	Bokovo	Fresendorf	2353.33	?	Gorjunova 2001 Abb. 10/1
750	Novgorod	Menkendorf	1909.37	Settelment – Burgwall	Gorjunova 2001 Abb. 12/2
751	Wolin Woj. Zachodnio – Pomorskie	Menkendorf	675.58	Settlement – town	Lüdke, Schietze 2001 Taf. 290/1
752	Fordon	Teterow	2403.95	Settelment – Siedlung	Lüdke, Schietze 2001 Taf. 300/2
753	Fordon	Teterow	11454.24	Settelment – Siedlung	Lüdke, Schietze 2001 Taf. 300/3
754	Fordon	Teterow	1912.72	Settelment – Siedlung	Lüdke, Schietze 2001 Taf. 300/6
755	Meetschow Kr. Lüchow – Danneberg	Feldberg	2519.68	Settelment – Burgwall	Lüdke, Schietze 2001 Taf. 301/10
756	Schleswig Kr. Schleswig	Vipperow	5376.43	Settelment - Burg	Lüdke, Schietze 2001 Taf. 305/14
757	Szczecin – Wzgórze Zamkowe Woj. Zachodnio – Pomorskie	Vipperow	12046.07 12154.24	Settlement – town	Cnotliwy *et al.* 1983 Ryc. 52/1
758	Szczecin – Wzgórze Zamkowe Woj. Zachodnio – Pomorskie	Vipperow	1761.85	Settlement – town	Cnotliwy *et al.* 1983 Ryc. 53/4
759	Szczecin – Wzgórze Zamkowe Woj. Zachodnio – Pomorskie	Vipperow	860.40	Settlement – town	Cnotliwy *et al.* 1983 Ryc. 53/5
760	Szczecin – Wzgórze Zamkowe Woj. Zachodnio – Pomorskie	Weisdin	74335.16 74579.47	Settlement – town	Cnotliwy *et al.* 1983 Ryc. 64/10 Lüdke, Schietze 2001 Taf. 296
761	Szczecin – Wzgórze Zamkowe Woj. Zachodnio – Pomorskie	Vipperow	3055.94	Settlement – town	Cnotliwy *et al.* 1983 Ryc. 137/1
762	Szczecin – Wzgórze Zamkowe Woj. Zachodnio – Pomorskie	Vipperow	2965.94 3014.48	Settlement – town	Cnotliwy *et al.* 1983 Ryc. 137/5 Lüdke, Schietze 2001 Taf. 295/3
763	Tornow	Menkendorf	2987.89	Settlement – Burg	Herrmann 1966 Abb. 27/b
764	Tornow	Menkendorf	2509.37	Settlement – Burg	Herrmann 1966 Abb. 28/c
765	Tornow	Menkendorf	323.08	Settlement – Burg	Herrmann 1966 Abb. 28/h
766	Tornow	Menkendorf	1329.07	Settlement – Burg	Herrmann 1966 Abb. 33/g
767	Tornow	Menkendorf	3033.69	Settlement – Burg	Herrmann 1966 Abb. 34/a
768	Tornow	Menkendorf	2385.38	Settlement – Burg	Herrmann 1966 Abb. 34/f
769	Tornow	Menkendorf	3023.23	Settlement – Burg	Herrmann 1966 Abb. 34/g
770	Tornow	Menkendorf	42500.85	Settlement – Burg	Herrmann 1966 Abb. 35/c
771	Tornow "Borchelt" Kr. Calau	Menkendorf	2456.25	Settlement – Siedlung	Herrmann 1973 Abb. 16/247
772	Tornow "Borchelt" Kr. Calau	Menkendorf	6579.95	Settlement – Siedlung	Herrmann 1973 Abb. 18/152
773	Tornow "Borchelt" Kr. Calau	Menkendorf	4742.12	Settlement – Siedlung	Herrmann 1973 Abb. 20/205
774	Tornow "Borchelt" Kr. Calau	Menkendorf	1232.02	Settlement – Siedlung	Herrmann 1973 Abb. 22/11
775	Tornow "Borchelt" Kr. Calau	Menkendorf	3562.43	Settlement – Siedlung	Herrmann 1973 Abb. 24/195 left
776	Tornow "Borchelt" Kr. Calau	Menkendorf	3582.17	Settlement – Siedlung	Herrmann 1973 Abb. 24/195 right
777	Tornow "Borchelt" Kr. Calau	Menkendorf	4187.93	Settlement – Siedlung	Herrmann 1973 Abb. 25/199
778	Sternberger Kr. Sternberg	Sukow	5333.66	Settelment – Burgwall	Schuldt 1983 Abb. 22/a
779	Sternberger Kr. Sternberg	Sukow	4550.54	Settelment – Burgwall	Schuldt 1983 Abb. 22/d

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